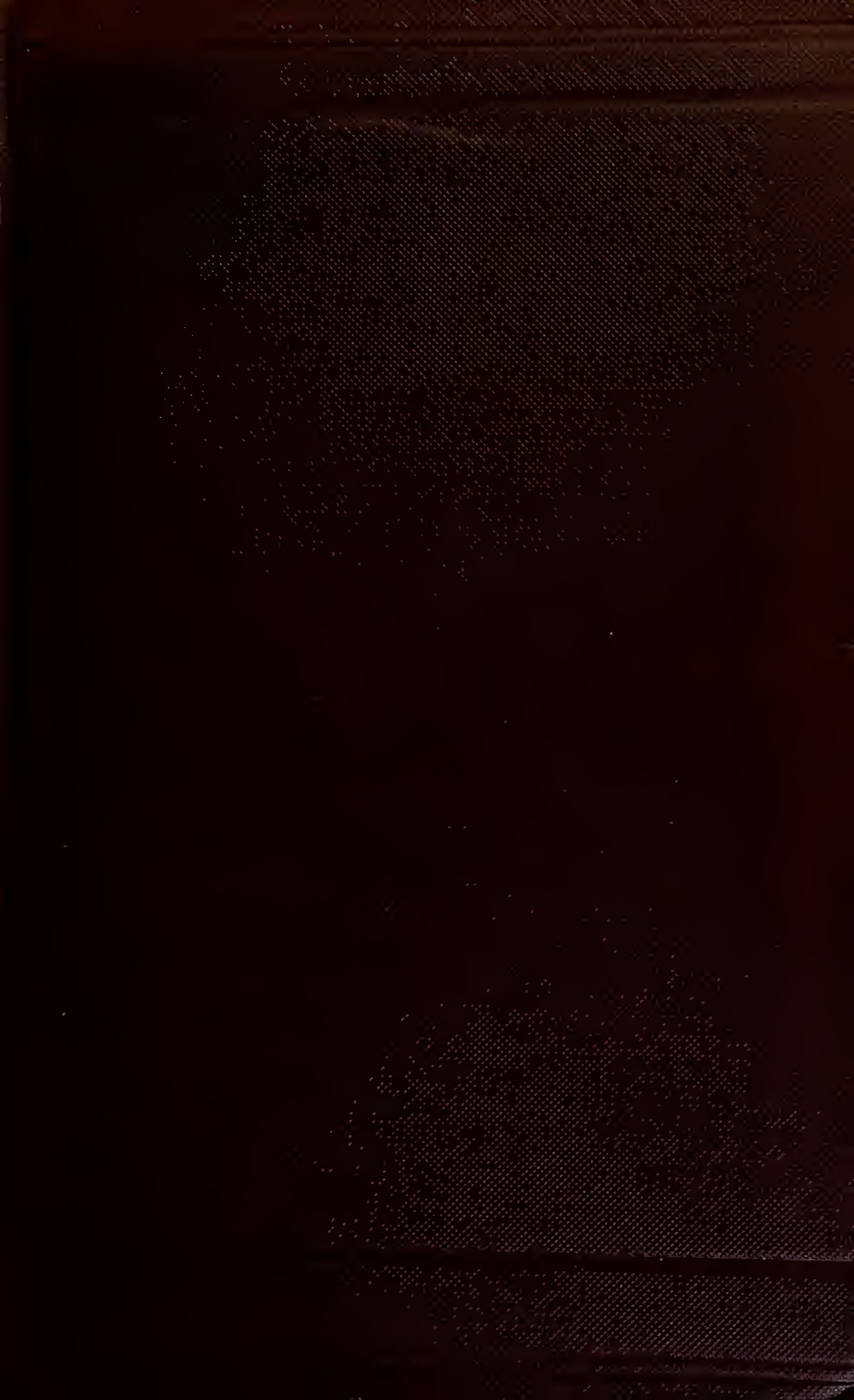

MENTAL AFFECTIONS

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AN INTRODUCTION TO THE STUDY OF INSANITY

BY

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PREFACE

The following pages consist of lectures delivered during several sessions to the students attending the class of Mental Diseases in the Royal Colleges' School of Medicine, Edinburgh. The lectures have been extended and rearranged, and while it cannot be claimed that they are exhaustive in scope or complete in detail, the author hopes that his general views on the ætiology of insanity, on the inter-relationship of the neuroses, the psychoses, and the diatheses, and on other cognate problems may be of suggestive value to some of those who, like himself, have experienced the perplexity and obscurity of the subject.

Edinburgh *September* 1899.

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PART I

INTRODUCTORY

CHAPTER I

MORBID HEREDITY

The great truth of physiological heredity—the transmission from parents to offspring, through innumerable generations, of certain physical and mental characters—has been recognised by all writers in all ages. Within the present century several theories have been advanced to explain this phenomenon. Of all these theories the two which have most powerfully influenced scientific thought and work are those of Darwin and of Weissmann. Both theories affirm the hereditary transmission of essential qualities, and they both discountenance the probability of the immediately direct transmission of recently acquired characters, such as mutilations, professional aptitudes, or accidental malformations. In his *Origin of Species* Darwin contends that heredity has for its main objects the transmission of ancestral characters intact (solidarity), the continual adaptation of the individual to its environment, the transmission of those characters which are most useful in the struggle for existence, and the maintenance of these qualities, so long as they are of use to the species (variation); but he has also shown that acquired qualities, either physical or mental, are rarely transmitted. According to the theory of Weissmann, living matter, as represented by the germ-plasm, is immortal. As in unicellular organisms, such as the amœba, propagation occurs by fissiparous division, the two separated portions being of equal age with each other and with the whole species; so in the higher animals, in which sexual reproduction is the rule, the germ-plasm is represented by the nucleus of the

cell, which continues after impregnation to live and to divide just as the amœba cell does. One half of it forms the embryo by successive subdivision, and the other is so subdivided that a portion of the germ-plasm passes into all the cells of the sexual system. So it happens that each of these elementary bodies, and consequently the embryo, which ultimately springs from them, possesses a germ cell contemporaneous with the individual in whom it is located, and in a sense coeval with the race. The offspring, therefore, cannot inherit from the parents, and the theory so far is antagonistic to the experience of mankind in general, and to the accepted laws of physiological and pathological heredity. But according to Weissmann, the continuity of heredity probably depends upon the presence of minute vital elements, which he terms "biophores," a group of which minute bodies forms what he terms "determinants." These determinants give to each cell its own special type. In the struggle for existence the strongest and most suitable determinants predominate. External conditions, which are constantly acting on the organism, and which are capable of modifying in a certain sense the determinants of the organism, modify also to the same degree the determinants of the germ-plasm which are contained in one of the cells of the organism. The persistence of these external influences throughout a succession of generations results in a permanent modification of the determinants; in other words, in the formation of new hereditary characters. In this sense, and in this sense only, Weissmann admits the transmission of acquired characters.

The characteristics of ancestors become hereditarily transmissible and modified in transmission in any of the following ways. One of the best known laws of heredity is that parents tend to transmit their mental and physical characteristics directly to their children. The child may inherit the characteristics of one parent only, or partly those of one and partly those of another; or it may exhibit the father's characteristics at one time of life, and at another time these may be replaced by those of the mother. It very often happens that certain individuals inherit a prepotency for the transmission of their own special characters, which always

predominate in the offspring to the exclusion of those of the other parent. It is owing to this faculty of prepotency that in some families the characteristic physical features, the powers of endurance, and the dominating mental qualities are infallibly transmitted in spite of disease, reverses of fortune, and constant crossing by marriage. A third factor in heredity is the tendency to the reappearance in the descendants of qualities or defects which have been latent or dormant for one or sometimes two or more generations. This is known as atavism. The latent character may be called into existence by the union of an individual in whom it is latent with another individual in whom it is potential. The term "collateral heredity" has, strictly speaking, no significance at all apart from atavism. It denotes the occurrence among collateral relations of certain characters similar to those which distinguish the individual possessor; but this only indicates that in the direct line the morbid condition has been latent for one or more generations.

What is true of physiological heredity is equally true of pathological heredity with regard to recently acquired characters. Mutilation, the majority of acute diseases and congenital malformations, though occasionally inherited, are not as a rule habitually transmitted from parent to offspring. The children of deaf mutes are able to speak and hear like other people. Pathological influences, acting on the germ-plasm and sperm cell, tend to break the continuity of physiological inheritance and to create new characteristics, which, being abnormal, are less in harmony with the environment, and consequently hamper the individual in the struggle for existence. It is not as a rule the special pathological characters themselves which are transmitted, but a predisposition—manifested usually by a morbid affection of nutrition, a feebleness of development, and certain functional incompetencies—which is capable of engendering under unfavourable influences diseases of very different appearances. This morbid hereditary deviation from the normal type, whether grave or light, is always associated with a corresponding change in some function of the nervous system; and this change in nervous function is called Degeneration.

In morbid heredity, diathetic and nervous conditions are seldom transmitted in the same form from parent to offspring. The morbid basis persists and it only is transmitted, the neuroses being transformed in each succeeding generation, and being different in members of the same family. This is known as dissimilar heredity or heredity by transformation. Atavism is extremely common in morbid conditions; many of the members of neurotic families escape during their whole lives without any manifestation of the neuroses. In a certain number of cases, however, the neuroses are transmitted by heredity in the same form from parent to offspring. This is known as analogous or similar heredity. In those fortunate cases who escape the family taint, if judicious unions are contracted, the morbid tendency may gradually eliminate itself, and a return to the normal condition finally occur. This is called regressive heredity.

In any of the above ways abnormal tendencies pass from ancestors to descendants; but the appearance of abnormal qualities, owing to a defective power to transmit perfectly normal characters or functions, is the true explanation of pathological inheritance. Degeneration, then, is the dissolution of normal heredity, and in its ultimate stages it ends sexual heredity by imposing sterility upon its more advanced subjects. The spermatic and ovarian cells, crippled in their power of development, are unable to promote evolution along the ancestral lines. Hence the various arrests in development, the various malformations of the body, and disordered functions of the nervous system (physical and mental stigmata), as well as the diminished power of resistance of the nervous system, which, being badly balanced, readily succumbs to all external factors of an unfavourable kind which act upon it.

Causes of Degeneration

The causes of degeneration include everything which is inimical to healthy life; but a few prominent, more effective causes are of sufficient importance to require special notice.

1. *Civilisation.*—While civilisation undoubtedly promotes physical and mental evolution, it remorselessly eliminates in its

triumphal progress all individuals who are incapable, through any cause, of keeping pace with it. A large number of human beings, debilitated and unfit for the harder trials of life, are bred up only to succumb in that part of their organisation—the nervous system—on which the requirements of modern life place the heaviest and severest strain. Civilisation, however, introduces into human life innumerable agencies which modify the struggle for existence by relieving mental and physical fatigue and rendering individual security of life and property more assured. Among these may be mentioned the various scientific appliances for communication and transit, a better and more abundant food supply, and the advancement of medical and sanitary science. In this way it promotes the development of a healthier and more vigorous race. By rendering the lot of the great mass of the population more prosperous and tolerable by improving sanitation both of dwelling-houses and of whole districts by the draining and cultivation of unhealthy and swampy soil, and by improving the drinking-water, disease is being eliminated; the general health standard is raised, and the tendency towards racial degeneration diminishes.

2. *Deficient Alimentation.*—For the conservation of the normal health of an individual, an abundant supply of a sufficiently good quality of food is necessary; without this the equilibrium between waste and repair is disturbed, and health permanently suffers. The badly-nourished individual uses up more material for the supply of the tissues than his resources can replace in the blood-stream; the blood, therefore, becomes poor in nutritive products, and anæmia results. Anæmia chiefly affects the nervous system, for its blood-supply is not only larger, actually and proportionally, than any other tissue or organ of the body, but it depends more directly for healthy function upon the amount of the blood and the quality of the blood passing through it at any given time. Extreme poverty entails not only insufficient food, but also insufficient clothing, exposure to cold, badly constructed dwellings, overcrowding, and a host of evil influences from which arise diathetic diseases, alcoholism, crime, and various other nervous disorders. The deplorable social condition of

the lapsed masses in large towns is undoubtedly owing in great part to their precarious methods of living. It is among this class that examples of degeneration are most common, and from it originate most of the criminal element of society. The criminal classes are the most degenerate, mentally and physically, of the whole community. Their degeneracy reveals itself not only by the presence of physical stigmata, such as asymmetries, malformations, and congenital ugliness, but also by various perversions, enfeeblement, neurasthenia, and insanity. The reports of the English convict prisons show generally that 1 in every 25 of the male prisoners is of weak mind, is insane, or epileptic, without including those whom it has been found necessary to remove to asylums. Dr. Thomson, late surgeon of the Perth convict prison, stated that out of 8000 prisoners examined by him, 12 per cent were mentally affected in one way or another. In the larger manufacturing towns, the physical degeneracy of a considerable section of the industrial population is apparent to the most superficial observer. Much of this prevailing feebleness of physical constitution is probably due to the general unhygienic surroundings of large industrial centres; but Dr. Ferguson of Bolton insisted many years ago that it is largely due to the defective and unsuitable alimentation of children, in whose dietary milk is reduced to a minimum, tea, coffee, and other substances being largely substituted for it. But, it may be argued, if defective nourishment is so important a factor in the causation of degeneracy, primitive man must in his precarious, hand-to-mouth existence have suffered more than any modern community, and yet we know from analogy that mental degeneracy at any rate is, comparatively speaking, unknown among savages; to which it may be answered: first, that savage conditions of life make it impossible for the individual to survive through infancy, childhood, and into old age unless the physical health is compatible with the requirements of the primitive surroundings; and, secondly, that conditions are relative to races and time, that primitive man, though perhaps not always faring so sumptuously by the chase as he could wish, must have known prolonged and dire poverty as seldom as most other animals. At any rate we know that he must

have been a stranger to that grinding, reckless poverty and squalor which at the present day are only too common in the larger towns, and even in some rural districts, throughout Europe.

3. *Alcohol.*—It is probable that chronic alcoholism is the primary condition from which all the other forms of alcoholism, and the diseases dependent upon it, are hereditarily transmitted. The occasional poisoning of the system by alcohol has probably little influence on descendants, provided the parents (or one of them) are not intoxicated at the time of conception, and that the mother is not given to alcoholic excess during gestation. Chronic alcoholism is the consequence of the often repeated ingestion of the spirit in sufficient quantity to disorder the normal physiological condition of the individual. It does not require that the person should ever be intoxicated in the common sense of the word, but that the system should be constantly saturated with the alcoholic poison. Two forms of alcoholic heredity are generally recognised: 1st, the similar or homologous heredity, in which the parent transmits to the offspring the tendency to drink; and, 2nd, the dissimilar heredity, or heredity by transformation, in which is transmitted one or other of the neuroses, such as insanity, mental weakness, epilepsy, hysteria, tuberculosis, or arthritism. Neither in the similar or the dissimilar form of heredity is it alcoholism that is transmitted, but a degeneracy, both physical and mental. The following, according to Morel,[1] is a typical example of alcoholic heredity:—

1st	generation.	Depravity, alcoholic excess, moral degradation.
2nd	do.	Drunkenness, maniacal attacks, general paralysis.
3rd	do.	Hypochondriacal tendencies, melancholia, suicidal and homicidal tendencies.
4th	do.	Undeveloped intelligence, mental obtuseness, sterility, and extinction of the race.

The following family history is given by Taguet:[2] Grandfather a drunkard, grandmother died of cirrhosis; an only son, eccentric and impulsive, died of alcoholism, leaving one son. This boy was impressionable to an extreme degree;

[1] Morel, *Traité des Dégénérescences.*

[2] Taguet, *Annales Méd. Psych.* (1897), xviii. p. 5.

he could not see a knife or a pair of scissors without a feeling of aversion or fear; he could not pass a cutler's shop or a soldier; and the least emotion threw him into a nervous crisis. During an attack of acute mania he made an attempt on his life. He had three children, one of whom died a few hours after birth; the second was normal at the time the report was written; and the third was hydrocephalous and died of convulsions.

From such facts as the foregoing, and many others of a similar nature which might be cited, we perceive that the influence of alcoholic excess in the parents induces in their descendants a debilitated constitution, disorders of nutrition, a low resistive power, a tendency to contract infectious diseases; in short, a general neurosis or diathesis, out of which may spring one or other of the numerous affections of the nervous system which depend upon disordered function.

4. *Syphilis.* — Hereditary syphilis manifests itself frequently as a degeneration of the system, known as the syphilitic cachexia. The syphilitic virus appears to act upon the tissues of the body as a toxin, causing profound disturbance of the chemical constitution of the organism, affecting the growth and vitality of its structures, and modifying the resistive power of the individual. It is in this respect that syphilis is to be regarded not so much in the light of a specific disease, which may pass out of the system, leaving no trace behind it, but as a general disorder of nutrition, which creates a morbid diathesis, and promotes the physical and mental degeneration of the individual. It is in this sense that Fournier[1] uses the expression "parasyphilis" to indicate the constitutional disorders and the many secondary affections which arise from the general action of the syphilitic virus in the absence of the special symptoms of ordinary syphilis. He says: "Affections of this kind are not essentially syphilitic; and the pathological anatomist may well exclude them from the list of lesions of the syphilitic order; but it is of little consequence, they are not the less syphilitic in origin."

In those children who survive the first few weeks or

[1] Fournier, *L'Hérédité Syphilitique*, p. 18.

months after birth, the syphilitic inheritance reveals itself by defective development, slowness of growth, late teething, late walking and speaking, and if they live on till puberty, the tardy development of the breasts and the late appearance of menstruation in females, and the late development of the beard in males. Hereditary syphilitic subjects are usually, even at adult age, stunted and atrophied, and according to Fournier infantilism is one of its best known characteristics. The affection may also manifest itself as a congenital malnutrition of certain parts of the body or its organs, which are arrested in development. Thus, the testicles, the breasts, or the ovaries may remain atrophied; and the development of the brain may be arrested in various ways, resulting in idiocy, epilepsy, imbecility, or simple weak-mindedness.

According to Lannelongue and Fournier, syphilis in the parents is a frequent cause of various bodily malformations of a congenital nature, such as club foot, malformation of the fingers, spinabifida, cleft palate, harelip, cranial asymmetry, microcephalism, and hydrocephalism.[1]

An important action of hereditary syphilis is its tendency to produce a disordered nutrition, characterised by an impoverished state of the system, and an enfeebled condition of the tissues, which reduces their resistive power, and forms a predisposition towards other diseases. Hereditary syphilitic children are particularly subject to diseases of the nervous system, and a large proportion of them die of convulsions and meningitis. They are also predisposed to certain diathetic conditions, especially to rickets and scrofulo-tubercular affections. Consequently, the subjects of hereditary syphilis are particularly subject to caries of bones, to Pott's disease, and to lupus. Finally, most of these cases present an enfeebled constitution, a lowered resisting power, a gray or earthy complexion, and a marked tendency towards diseases of the lymphatic system. Mental impairment is one of the commonest symptoms, which is not to be wondered at, considering the frequency with which the nervous system is attacked by the syphilitic virus. The forms in which mental affection usually manifests itself have been classified as follows:

[1] Fournier, *loc. cit.*

(*a*) those in which there is a general defect of mental development, with moral or intellectual deficiencies; (*b*) those in which there is atrophy or destruction of one or other parts of the hemispheres, with or without epilepsy or paralysis; (*c*) those in which deprivation of the senses, sight or hearing, or both, commencing in early infancy, leads to idiocy.[1]

5. *Tuberculosis.*—The tubercular diathesis includes scrofula, pulmonary tuberculosis, general tuberculosis, lupus, and the various tumours and abscesses which are recognised as being of strumous origin. Tuberculosis is almost universally regarded as a hereditary disease, and it follows in its transmission the same laws which regulate the hereditary transmission of other constitutional maladies. It has a close connection with the neuroses and with insanity. Tuberculosis and nervous diseases occur in members of the same family, either separately or, as frequently happens, combined in the same individual. The parallelism between insanity and tuberculosis is exemplified in that "they both appear at the period of adolescence; that they attack full maturity and middle life freely; and that they both tend to decline in old age."[2] Grasset[3] considers hysteria as one of the manifestations of the tubercular diathesis. In phthisical families he has frequently found one of the children dying of tubercular meningitis, another of pulmonary phthisis, a third escaping free, while a fourth was hypochondriacal, hysterical, or insane.

The tubercular diathesis is supposed by some to be the result of any depressing or unhygienic influences which lower the vitality of the organism. Among such influences are cold and damp climate, overcrowding, deficient food-supply, intermarriages, very early marriages, and advanced age of the father. Many of these causes are complicated and act together, especially among the poorer inhabitants of large towns. It is believed by others that syphilis and intemperance in the parents have considerable influence on the development of the diathesis.

Some authorities, among whom may be mentioned Morel,

[1] Barlow and Bury, Tuke's *Dict. Psych. Med.* p. 1261.

[2] Clouston, *Dict. of Psych. Med.* Hack Tuke, p. 940.

[3] Grasset, *Brain* (1884), p. 433.

Charcot, Crocq (Fils),[1] Sakorrhaphos, look upon the tubercular diathesis as an advanced degeneration of the species on the same lines as the other constitutional diatheses, but indicative of a lower stage of degeneration. The extraordinary prevalence of tubercle which affects all races of men and most of the lower animals, does not militate against the belief which has always been held that there is a diathesis which is peculiarly liable to the ravages of the bacillus. The outward physical manifestations of the diathesis lend countenance to the belief that it exists in two forms—(1) in the liability to pulmonary phthisis alone; and (2) in the more advanced and more degenerative form, known as the scrofulous diathesis, in which other manifestations of the disease, such as glandular and bone affections, and general tuberculosis, are common, and which is most frequently associated with idiocy, and with physical and mental malformations which are indicative of the decay of the species.

6. *Infectious and Miasmatic Diseases.*—While the liability to ready infection by morbid micro-organisms and toxins is one of the signs of degeneration, there can be no doubt that these infections predispose their subjects to nervous degeneracy. Recent investigations into the æetiology of endemic cretinism have tended to show that this disease is caused by miasmatic influences interfering with the growth and functions of the thyroid gland. Malaria exercises a detrimental effect upon the individual constitution, and even in persons who live in a malarial district, but who have never suffered from fever, the distinct cachexia may not unfrequently be observed.

Pellagra is a disease of the nervous system accompanied by mental symptoms and followed often by degeneracy in the descendants. This transmitted degeneracy is characterised by mental and physical feebleness and a marked predisposition to the recurrence of the affection in the predisposed offspring. The disease is common in the southern parts of Europe, especially in Italy, and has been indubitably traced to the eating of immature and otherwise unwholesome maize.

[1] Crocq (Fils), *Revue de Médecine* (1896), p. 373.

Rheumatism is one of the most widely spread and best observed diseases in Europe. Acute articular rheumatism, which is the clinical type of all rheumatic affections, is admittedly hereditary in the sense that the descendants of those affected by it show an undoubted predisposition to contract it, and manifest a degeneracy which is well known as identical with the arthritic diathesis. The tendency of the affection to recur at a particular age, the liability to repeated acute attacks in the same individual, and the fact that many joints suffer simultaneously and in succession, point to the constitutional nature of the affection. But we believe (so far as a yet undemonstrated theory can assure us) that for the production of acute rheumatism it is necessary that a poison should be introduced from without; also that there should exist a special fitness in the tissues of the motor apparatus of the body for the growth of the malarial poison. We are on these grounds forced to the conclusion that the origin of the rheumatic degeneration depends primarily upon a form of miasmatic infection. Such a conclusion may appear commonplace, but when we consider the neurotic affinities of rheumatismal degeneration it assumes gigantic and far-reaching proportions. The relation of chorea to rheumatism has now been fully accepted by all modern writers on nervous affections. Its relations with hysteria are also very frequent, hysterical patients being related to or descended from rheumatics in a proportion so considerable as to make the fact more than remarkable. A rheumatic joint is often the starting-point of an hysterical attack, and the subjects of hysteria are strongly predisposed to rheumatism. The combination of rheumatism and epilepsy has been referred to by many writers, *e.g.* Féré.[1] Rheumatic affections of the nervous system, especially of the brain, are almost exclusively confined to persons who manifest a predisposition towards the neuro-arthritic diathesis. One might finally call into evidence the very large proportion of cardiac valvular lesions found among the insane, as well as the mental manifestations of ordinary cardiac disease. Both these questions, notwithstanding their great ætiological importance, remain practically

[1] Féré, *La Famille Névropathique*, p. 136.

uninvestigated, and no generalisations or deductions can, therefore, be based upon them.

7. *Arthritic Diathesis.*—Gout is one of the principal forms in which the arthritic diathesis becomes individualised. Every gouty subject suffers from an excessive accumulation of uric acid in the system, as well as from a perverted or imperfect nutrition, as a consequence of which the blood and tissues become charged with substances which are the result of imperfect oxidation and metabolism. Instead of the terminal products of metabolism, water, carbonic acid and urea, intermediate products, uric acid, fat, fatty acids, and unoxidised sugar occur in excessive quantities in the organism. As a result of this defective metabolism, obesity and diabetes are frequently met with in the family and personal history of the sufferers. But apart from the presence of these imperfectly oxidised products in the blood, and apart also from the local joint lesions, the arthritic diathesis itself, which lies at the root of the disease, may be recognised, either by means of various functional disorders and physiognomical appearances, or by the occurrence of other disorders that belong to the arthritic group.

However healthy the individual may appear, and however well nourished, it may generally be ascertained from careful inquiry that the enjoyment of equable good health is in most instances extremely rare. The mere existence of a diathetic predisposition is incompatible with perfect health.

Most of the authorities who have written on the subject of gout admit its hereditary character; but they differ widely in their statistics, varying from 40 per cent (Bouchard [1]) to over 90 per cent (Gairdner [2]). Certainly gout is often found in the family antecedents of the persons suffering from it; but many other constitutional diseases are also found in the ancestry; and it therefore becomes necessary to ascertain the morbid affinities of this affection with the other diathetic conditions. For this purpose I quote from Bouchard [1]:—

[1] Bouchard, *Maladies de la Ralentissement de Nutrition.*

[2] Gairdner, *On Gout, its History, its Cause, and its Cure,* 4th edition.

The following diseases were found in the family antecedents of 100 cases of gout :—

Gout	44	times
Obesity	44	„
Rheumatism	25	„
Asthma	19	„
Diabetes	12·5	„
Gravel	12·5	„
Eczema	12·5	„
Biliary lithiasis	6	„
Hæmorrhoids	6	„
Neuralgia	6	„
No hereditary disease	12	„

In the personal history of 100 cases of gout the following diseases occurred :—

Obesity	31	times	
Dyspepsia	31	„	
Gravel	28	„	
Migraine	19	„	
Eczema	19	„	
Neuralgia	12	„	
Asthma	9	„	
Acute articular rheumatism	9	„	24 times
Muscular rheumatism	9	„	
Chronic articular rheumatism	6	„	
Hæmorrhages	6	„	
Urticaria	6	„	
Diabetes	3	„	

"You will observe," says Bouchard, "that the gouty subject is rarely diabetic (3 per cent); in the same way the diabetic subject is rarely gouty (2 per cent). On the other hand, these two affections are most commonly united by heredity. In 18 per cent of the cases the diabetic has a gouty ancestry, and in 12 per cent the gouty subject is the descendant of diabetic parents." This is a most important observation, and is illustrative of the hereditary transmutability of the diatheses and neuroses.

Upon the other members of the disease groups through which arthritism individualises itself, it is unnecessary to enlarge at length. They include rickets, osteomalacia, biliary lithiasis, obesity, diabetes, and gravel. They all depend upon

retarded nutrition and defective metabolism; and they are all associated with a common underlying diathesis, which predisposes the individual to nutritive changes, which, when they become accentuated in any special direction, appear as definite diseases under one or other of the names and forms which have been mentioned. When nutrition has for a long time been vitiated, there results a condition in which the body is richer in certain compound substances, and poorer in others, than in the normal state. The chemical constitution of the body becomes ultimately modified, and as a consequence its vitality and nutritive activity are altered. Upon this structural and physiological alteration the previously mentioned diseases form themselves, while the diathesis remains the same. That this is so is manifest from the interchangeability of these diseases in diathetic families. The same diseases which are found to exist in the hereditary antecedents of patients suffering from gout and rheumatism are also found in the personal history and hereditary antecedents of the subjects of obesity, biliary lithiasis, diabetes, and gravel.

Nervous affections of all kinds are extremely common in the arthritic group of diseases, more especially in gout and diabetes. In the former the precursory nervous irritability may range from ebullitions of temper up to hypochondria and melancholia of a severe type. Féré records that melancholia lasting two years was removed by an attack of gout; and the occurrence of cases of insanity on the sudden cessation of an attack of gout are recorded by Garrod, Whyte, Dagonet, and others. Many authors refer to the frequency of gout alternating with the psychoses and neuroses, such as epilepsy (Féré),[1] hysteria (Charcot), and neuralgia (Déjerine).[2] Conolly Norman records a case of insanity alternating with gouty asthma.[3]

In diabetes such nervous affections as neurasthenia, monoplegia, muscular atrophy, anæsthesia, neuralgia, and disorders of the special senses are common. It is also generally recognised that the patients are subject to asthma, angina pectoris,

[1] Féré, *loc. cit.* p. 146.

[2] Déjerine, *L'Hérédité dans les Maladies du système nerveux.*

[3] Norman, Conolly, *Journ. Ment. Science*, April 1885.

exophthalmic goitre, and locomotor ataxia. On the mental side there have also been recognised, as appertaining more or less constantly to this disease, failure of memory, suicidal tendencies, moral decadence, and general mental enfeeblement.

The effect of the arthritic affections in producing degeneracy of descendants is no less marked than are their nervous affinities. The result of this inimical influence may not manifest itself for many generations in the positive nervous degeneration of the species. In other instances, however, the manifestation of abnormal nervous symptoms is comparatively rapid, and may appear in the second or third generation. The length of time during which the ancestors may be subjected to disease changes without materially influencing the characteristics of the offspring depends on two things: (1) on the inherent resistive power of their organisms, and consequently that of their descendants; and (2) on the natural tendency of all living matter to revert to the normal type. The latter tendency is fostered by fortunate intermarriage, in which one of the parents is free from the vices of organisation possessed by the other. In the less fortunate instances, in which both parents are similarly affected by any diathetic constitutional malady, whether purely nutritive or nervous, the heredity is accentuated and accumulated to such an extent as to fatally implicate the descendants.

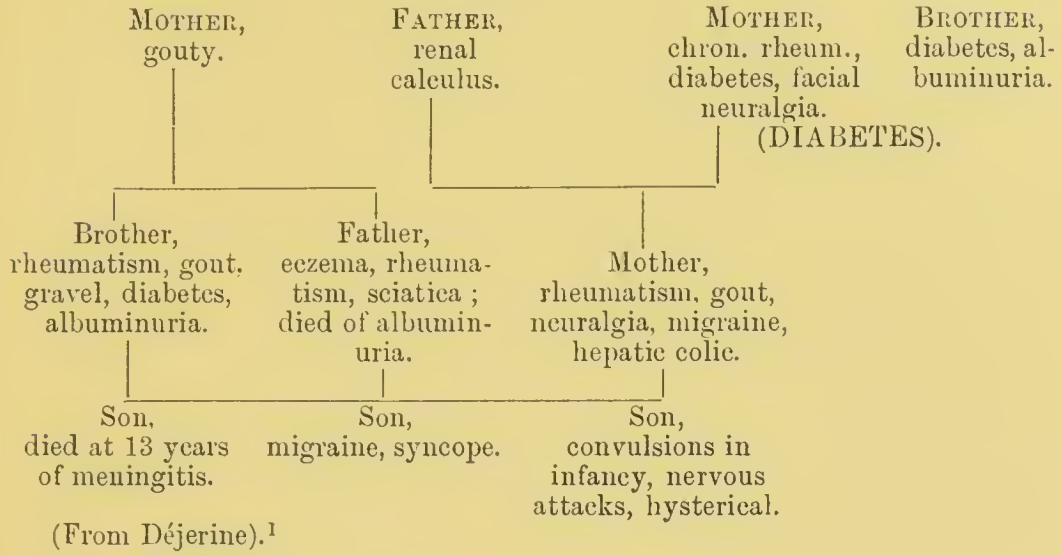
TABLE I

Father, eczema, died suddenly.		Mother, hysteric.
Son, diabetes; died of anthrax.	Son, diabetes; died of phthisis.	Son, migraine, rheumatism, asthma; after pecuniary loss had an attack of mania, with hypochondria and hysterical symptoms, followed by recovery.

(From Déjerine).[1]

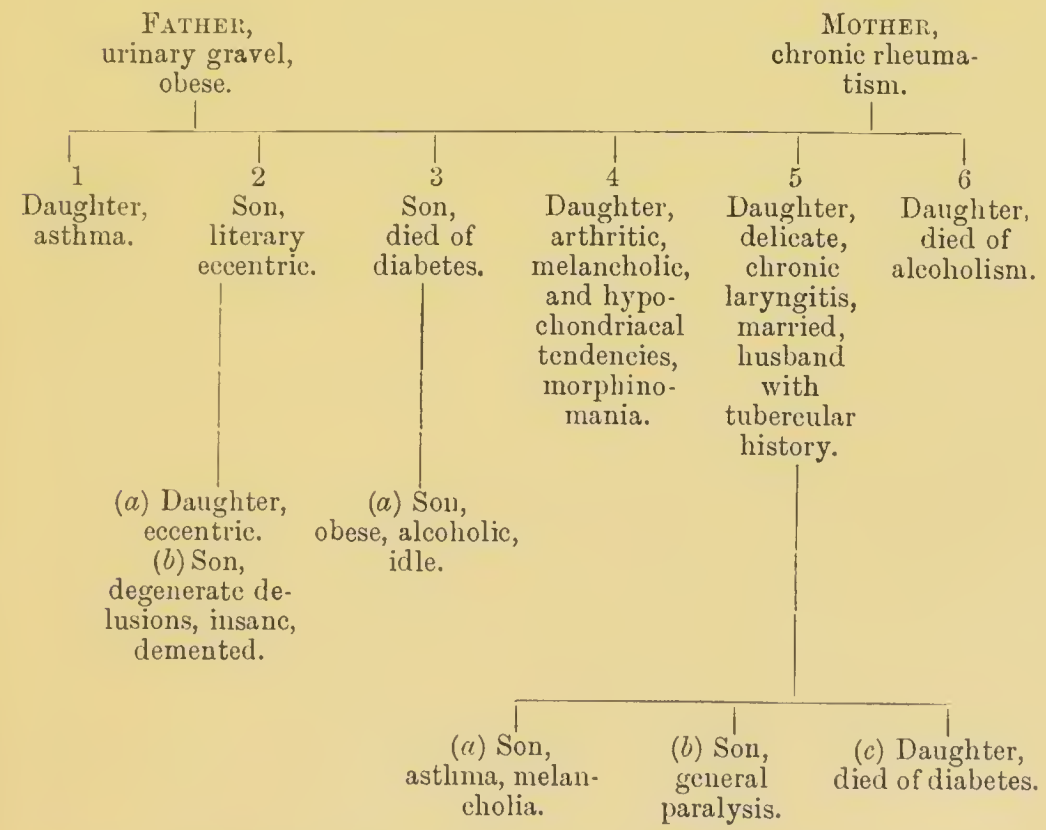
[1] Déjerine, *loc. cit.*

TABLE II



(From Déjerine).[1]

TABLE III



The transition from the purely diathetic conditions to the neuroses proper and to insanity is bridged over by

[1] Déjerine, *loc. cit.*

a group of affections which are termed the abarticular diseases, or the abarticular manifestations of the arthritic diathesis. They include principally migraine, neuralgia, and asthma. The subjects of these diseases are united by every relationship and by descent with persons who are or have been gouty, rheumatic, or the victims of some other constitutional affection of nutrition. On the other side they are as intimately related with the neuroses and psychoses. Migraine, neuralgia, rheumatism, and asthma not only occur frequently in the family histories of the insane, but they are the most common of all affections in the previous personal history of the patient, and one or other of them may either complicate the attack of insanity, or succeed it, or alternate with periods of mental disturbance.

CHAPTER II

THE EVOLUTION OF INSANITY

It may fairly be asked whether the ideally normal man can possibly become insane, and the answer in the light of our present knowledge is that he cannot. It is as reasonable to suppose that a healthy man is liable to become blind or deaf or ataxic or hemiplegic, excluding the influence of accidents, as, with the same reservation, that he may under any ordinary circumstances become mentally deranged. The difference between the person who may become insane and the person who will not become insane is one entirely of hereditary predisposition. Take two men suffering from an analogous type of the same fever; the one may be violently delirious, the other not. Place two parturient women in the same unfavourable unhygienic circumstances; the one may or may not have puerperal fever, the other may develop puerperal mania. Give two individuals excessive doses of alcohol; both will be poisoned, but one of them may manifest acute mental aberration: or let two men drink alcohol in equal quantities all their lives; one will remain a respectable citizen, the other will degenerate into a disreputable chronic alcoholic. Finally, let two men be equally exposed to the various adverse factors which are described in most text-books as the determining causes of insanity; one will succumb, the other will remain normal.

In face of these everyday facts of experience, we are bound to inquire a little deeper for the true cause of insanity, and for the same reason we must discard the individual and look to the family history. The family history of the insane

is extremely difficult to ascertain, not only because people are unwilling to admit the presence of insanity in their families, but because in the great majority of instances questions are solely directed towards the elucidation of a history of mental aberration which often either does not exist or is unknown. There are other affections, however, which are equally common in neuropathic families, the significance of which is of supreme importance. I refer to the morbid diatheses and the neuroses. If then we can establish in any of our patients a family history of these affections, the actual presence of insanity, which is merely a neurotic manifestation, is by no means necessary. Is there a history of gout, rheumatism, diabetes, gravel, phthisis, hysteria, migraine, epilepsy, asthma? If so, your patient supplies the instance of transformed neurosis: the morbid taint is fully established.

The subject of ordinary insanity is not a normal individual. There exists and has always existed in his constitution a latent predisposition which an accidental determining cause may at any moment transform into evident symptomatic manifestation. Often no cause is required, the dormant character of the morbid nervous state being sufficient to force itself spontaneously into activity. On the other hand, there are, unquestionably, thousands of predisposed persons who escape the graver risks of their faulty inheritance and pass through life untarnished by insanity.

We have seen that the process of nervous degeneration is accompanied by various changes in metabolism of a deleterious nature, such as gout, rheumatism, diabetes, lithiasis, etc.; and that it conduces to a lowering of tissue resistance, which exposes the subjects to acute and chronic infection by fevers, tubercle bacilli, malaria, and cancer. It has also been shown that these poisons, to which may be added syphilis and alcohol, create a special diathesis or morbid predisposition, which is transmissible in families, and which, sooner or later, alternates in the various individuals of the family more frequently than not with the various neuroses and with insanity. Why a transformation should take place sometimes and not always, or why it should take place at all, we cannot tell. We can only conceive that below and behind

all symptomatic manifestations, whether diathetic or neurotic, there lies a dormant predisposition which we call degeneration, because it is a departure from the normal type, because it tends towards disease, because it is the manifestation of a weakened and exhausted condition, and because, if unchecked, it ends in death and extinction. What, then, is this predisposition, and can it be recognised apart from its major manifestations? A condition variously named and often described, perhaps most correctly and scientifically under the name "neuropathia," appears to correspond most closely with the permanent underlying state of the nervous system which we loosely term predisposition.

To the clinical appearances of this morbid predisposition the terms "nervousness," "neurasthenia," "chronic fatigue or nervous exhaustion" are applicable. The outward manifestation of this affection, known as neurasthenia, forms a distinct neurosis in itself, possesses a complete separate existence, and, to a certain limited extent, renders the subject immune from other neuroses. It ranks, therefore, with epilepsy, hysteria, or one of the psychoses.

"If," says Möbius, "one takes into account only the more serious nervous affections, the mistake may be made of supposing that the greater number of the descendants of the insane escape altogether. But the more carefully the members of a neuropathic family are observed, the more evident it becomes that the apparently healthy frequently manifest physical and mental stigmata of degeneration. The so-called trivial forms of neuroses are a grievous burden to such people, and if their symptoms, regarded at any given time, do not appear important, yet the sum of their sufferings throughout a lifetime are certainly worthy of consideration." [1]

That insanity itself is transmissible is so generally accepted a doctrine that it is unnecessary to dwell upon it; but the mode of its transmission is a subject that has been hitherto much too lightly passed over. At the risk of prolix repetition I must again insist upon the fact of the transformation and transmutation of the neuroses in their transmission. Although the children of an insane parent may

[1] Möbius, "Ueber nervöse Familien," *Zeit. für Psych.* (1884), p. 228.

not manifest the signs of mental aberration, it only exceptionally happens that the neurotic inheritance disappears entirely from the family. Where atavism intervenes, the neurosis of the first generation frequently reappears in some of the members of the third generation. What, however, of those who escape both in the second and third generation? Is the predisposition dormant entirely, or does it manifest itself in the lighter, less observable, minor neuroses? Undoubtedly some members of such a family must be considered as normal, in the absence of any positive signs to the contrary; but undoubtedly also the latent disposition will manifest itself in others in numerous subsidiary but none the less conscious and painful ways. To say nothing of mild neurasthenias, we must take into account alcoholic tendencies, morbid timidity, eccentricities, excitability, credulity, impressionability, and a host of similar abnormalities, both mental and physical. If we neglect these facts we lose sight of the meaning and significance of the general solidarity of nervous inheritance.

Among the more important mental consequences of the neuropathic inheritance, apart from insanity, may be mentioned suicide, genius, crime, vice, and the absence of the moral sense.

There is no more remarkable fact in the whole range of morbid heredity than the direct transmission of the suicidal tendency in neuropathic families. It even happens occasionally that all the members of a suicidal family select the same mode of self-destruction, and it more frequently is the case that they tend towards the commission of the act at the same age. Hammond[1] records the case of a man who cut his throat in a bath at the age of thirty-five. Of his three children, two sons killed themselves at the same age as their father, and a daughter cut her throat in a bath when thirty-four years old. This daughter left one son, who killed himself at the age of thirty-one years under precisely similar conditions. Suicide exists undoubtedly as an impulse among the degenerate, and manifests itself as one of the forms of the neurotic diathesis in families in which other nervous affections

[1] Hammond, *Treatise on Insanity* (1883), p. 179.

are common. Thus it is most commonly present in families in which there is a strong predisposition to insanity; and it appears as a distressing complication in the course of many forms of mental affection, more especially in melancholia.

Genius has in the popular mind been all along associated with a predisposition to insanity. *Nullum magnum ingenium nisi quadam stultitiae*, says the old adage. Some authorities, conspicuously Moreau de Tours[1] and Lombroso,[2] who boldly assert that "genius is a neurosis," have given the weight of their opinion in favour of this view. It is undoubtedly true that in neuropathic families one member may exhibit conspicuous genius, while another is insane or epileptic. It is also probably true that a particularly large proportion of the greatest men in history have been affected with minor or major forms of the neuroses or psychoses. Some abnormality of nervous function has confidently been associated with the names of such men as Socrates, Mahomed, Charles V., Julius Cæsar, Napoleon Buonaparte, Tasso, Benvenuto Cellini, Pascal, Luther, Peter the Hermit, Joan of Arc, Swedenborg, and others. In men of exceptional ability, including many great historical personages, it has been pointed out that there is frequently a tendency to melancholic depression, especially of a hypochondriacal nature, which has been regarded as a reaction occurring at intervals during the lifetime from the strain and weight of extraordinary brain exertion. Are we justified, then, in regarding genius as a manifestation of the neuropathic diathesis? Undoubtedly in a very large number of cases we are, while in a certain number of the very highest geniuses, such as Goethe and Shakespeare, the implication of degeneration or insanity is neither probable nor permissible. The existence of mental defects, obliquity of mental vision, imperfect cerebral development, and marked defection of character, is scarcely compatible with the breadth of view, powerful imagination, and great intellectual strength of men in the very first rank of human genius. But between the ordinary man and the "God-sent" genius there is every

[1] Moreau de Tours, *La Psych. Morb. dans ses rapports avec la philosophie de l'histoire*, 1859.

[2] Lombroso, *L'Homme de Génie*, 2nd ed. 1896.

gradation; and it must be admitted that the majority of those of whose history we possess any knowledge have manifested clearly that they were neuropathic. Truly in this respect "the weak things of this world have been chosen to confound the strong." That the world should owe its progress and civilisation in great measure to the products of pathological human degeneration is a paradox, the irony of which should cause us to ponder and consider our ways. If we think on the subject at all we must take into account the enormous suffering among many unheard-of individuals, which is implied in the birth of one man of genius, and also the unhappy lives led by the men themselves. "No more calamitous gift for the individual than genius, for the men of genius are, even with apparent outward good fortune, yet always those men who most deeply and irremediably feel the wretchedness of existence. But men of genius are not here for their own sake, but for humanity; and for humanity, it is quite indifferent whether in fulfilling their task they feel miserable or even perish in distress."[1] In considering the relationships of genius to the neuropathic constitution, there are two chief characteristics among many to be pointed out as common to both. First, there is always an extreme nervous susceptibility to impressions, which implies a finer and more subtle delicacy of thought and feeling, which permits of a keener sympathy, and a deeper, clearer insight into men and things, than are granted to ordinary beings. That this constitutes a defect of often great consequence to the individual, as well as a quality of still greater import to the race, is sufficiently clear. Second, and partly dependent on the first, as well as on a disharmony or disequilibrium of cerebral development, there is generally to be observed in men of genius a novel and bizarre way of regarding events, which has often the result of placing them in a minority of one, and eccentricities and unconventionalities of conduct which have the effect of estranging them from their fellows. No doubt this is partly due to the fact that the genius lives in the van of his age, that he therefore differs from it, and is in consequence pronounced mistaken, unpractical, or mad. It is

[1] Von Hartmann, *Philosophy of the Unconscious.*

no less the case that he is different because he is mentally and physically a being apart, abnormal, a departure from the common type, in short, degenerate. There are many forms, as there are many degrees, of genius. One of the most common forms is that in which we meet with an extraordinary development of mental aptitudes in certain directions, accompanied by limited or inferior capabilities in others. As to the pathological nature of this group there can be no manner of doubt. It corresponds with those numerous varieties of mental aberrations which owe their origin to cerebral disharmony and defective development of the nervous system, and in this relation it is in touch through uninterrupted transitional forms with idiocy and imbecility. On the one extreme we have the fanatic, whose inherent disposition renders him dissatisfied with the existing state of things and leads him "to suffer greatly and to react with corresponding force, being a means of dragging the world forward at the cost of individual comfort." [1] Such people are so much engrossed with their idea, so one-sided, that they are blind to the force of circumstances with which they have to contend, and heedless of their surroundings, their personal interests, and their worldly welfare. "Howbeit they had not immediate success, their work may not have been all in vain." On the other extreme are met with persons of feeble intellect with conspicuous talent in one sphere, such as music or arithmetic. Many instances of peculiarly pronounced aptitudes in idiots are not the less striking because they stand merely in a comparative relationship to the general mental development of the individual. Those illustrations of precocious mental development known as "infant prodigies" properly belong to this class, for their neuropathic heredity is frequent, and more often than otherwise they end in imbecility or premature dementia.

The disharmony between the mental faculties which has just been referred to as appertaining to certain forms of genius is also evident in the subjects of moral insanity, including the vicious and the criminal. There is no proper legitimate distinction between vice, crime, and insanity. Their separation is entirely one of kind; and if they remain distinctly separated

[1] Maudsley, *Pathology of Mind*.

in the popular mind, it is not because proofs of their intimate relationship have not for years been lavishly produced by men who have made these subjects their proper study, but through dread of the imagined consequences of condoning those evils for which the only remedy is fondly believed to be individual punishment. There have always been, and for a long time to come there will still probably continue to be in every class of society people of fair intellectual endowment to whom the moral sense is an unintelligible abstraction. They are analogous to those who hear the musical noise but cannot distinguish time, or to Daltonists who cannot recognise certain colours. Such beings are mentally defective. They are antisocial, and are as inimical to society, though not so apparently so, as if they were intellectually deficient. No doubt there are different kinds of criminals. Maudsley[1] divides them into three classes: (1) Those who, not being really criminally disposed, have fallen in consequence of the extraordinary pressure of exceptionally adverse circumstances. (2) Those who, having some degree of criminal disposition, might still have been saved from crime had they had the advantage of a fair education and of propitious conditions of life, instead of the disadvantages of an evil education and of criminal surroundings. (3) The born criminals whose instincts urge them blindly into criminal activity, whatever their circumstances of life, and whom neither kindness nor instruction nor punishment will reform. The frequency of degeneracy and insanity among criminals has already been alluded to (*vide ante*, p. 8). Lasègue[2] has pointed out the frequent presence of antecedent criminal acts and of vagrancy, debauchery, and instinctive perversion in the history of persons who afterwards became insane. The occurrence of crime and vice in the descendants of the insane, and of insanity in the ascendants of criminals, has been fully inquired into by Lombroso,[3] whose researches leave no ground for doubting the intimate family connection which exists between crime and insanity.

The relationship of insanity to the principal neuroses, and to

[1] Maudsley, *Pathology of Mind*, p. 101.
[2] Lasègue, *Arch. gén. de Méd.* 1864.
[3] Lombroso, *L'Homme Criminel*, p. 577.

the extreme degenerations and malformations known as idioey and imbecility, remains to be investigated. I select three typical neuroses for this purpose, viz., ehorea, hysteria, and epilepsy.

Chorea.—In the chorea of Sydenham, whieh is chiefly observed in children between ten years and puberty, the heredity is rarely similar. Among the aseendants of the patients are found hysteria, epilepsy, insanity, neurasthenia, or very often only rheumatism. In the last-mentioned case it bears a resemblanee to hysteria, whieh has also marked rheumatie affinities. Every form of mental aberration is met with during the eourse of the affeetion, extending from simple change of eharaeter up to the severest type of mania. The oecurrence of the psychoses associated with this neurosis is proof of its neuropathie origin.

Hereditary chorea, or the ehorea of Huntington, is a chronie progressive affeetion oeeurring usually from thirty to forty years of age, and rarely after the age of fifty. It is generally aceompanied by mental aberration, and often by attempts at suicide, the patients becoming taciturn, eapricious, and avoiding the society of others. Gradually the mind becomes more enfeebled, until a state resembling idioey or dementia is reaehed. Clarence King[1] reports a family history in which the great-great-grandfather and four of his children out of ten were affeeted with chorea. The fourth was the father of nine children, one of whom only was affeeted by the disease. This one, out of five children, had three ehoreic daughters, and one son who was the subjeet of ehorea in infaney, but who eompletely reeovered. This son again presented the first symptoms of hereditary ehorea at thirty-five years of age. *Almost all the members of this family were also subjeet to mental troubles.*

Hysteria.—Of all the neuroses hysteria is the one in whieh it has been most clearly established that hereditary influenees predominate in its ætiology. The relations between hysteria and insanity are very evident. They exist not only hereditarily between ascendants and deseendants, but they also eo-exist frequently in the same individual, oeeurring sometimes synchronously, at other times appearing separately at different

[1] King, *Journ. of Med. Sc.* New York, 1885.

times. Nor can it be admitted that the manifestations of insanity are always merely the result of the disordered state of the brain, caused by the neurosis; on the contrary, the two affections frequently appear in the same individual with distinctive characters, separate courses, and terminations quite independent the one of the other. The connection, however, that is of most importance for the present purpose, is the hereditary one, the presence of hysteria in the antecedent history of insanity, and of insanity in that of hysterical patients.

Doutrebente[1] records a case in which an hysterical woman, the descendant of epileptic parents, gave birth to a daughter who was insane, and who, in her turn, became the mother of an imbecile child. The same author reports the case of an hysterical girl whose grandfather, father, and two aunts were insane, four or six cousins dipsomaniacs, and a brother feeble-minded. He also reports the case of a man, subject to severe hysteria, and whose mind partially gave way in consequence, who had two children who succumbed to convulsions in infancy; one daughter who was a microcephalic idiot, one son microcephalic and weak-minded, one son of unstable character, and one daughter with hysteria and progressive degeneration.

According to Briquet,[2] 25 per cent of the relations of hysterical subjects have been affected with nervous diseases or disorders of the brain; while among non-hysterics only 2·8 per cent of relatives so affected can be ascertained. The same author states that the similar heredity in hysteria is the most frequent, and that 50 per cent of hysterical mothers transmit the affection directly to one or more of their daughters. Taking thirty-five hysterics whose family relations amounted to 1103 persons,—430 men and 673 women—he found among the ascendants and collaterals—

Hysteria present	214 times.
Insanity „	16 „
Epilepsy „	13 „
Other convulsions	14 „
Apoplexy present	10 „

[1] Doutrebente, *Annales Méd. Psych.* (1869), ii. p. 375.

[2] Briquet, *Traité clin. et thérap. de l'hystérie.*

According to Féré,[1] in the dissimilar heredity of hysteria, mental affections occupy the first place, then follow epilepsy and alcoholism.

Epilepsy. — The intimate connection between migraine, chorea, hysteria, and epilepsy, on the one hand, and the connection between insanity and epilepsy on the other, is far too well established to need confirmation. Nearly 50 per cent of epileptics become insane, and about 9 per cent of patients sent to asylums in this country are epileptics.

That epilepsy is a directly transmissible disease from parents to offspring has been over and over again shown by statistics. The experiments of Brown-Sequard on guinea-pigs, which were rendered artificially epileptic, resulted in the transmission of epilepsy to the descendants of these animals. Luciani obtained the same results with dogs, and Féré[2] records the case of an epileptic, in whom the disease resulted from a traumatic accident, and who remained an epileptic for four years. During that period he had had one daughter who, from the age of five years, was an epileptic. Eccheverria[3] gives statistics of 533 children, the descendants of 136 epileptic parents. Of these, 195 died in infancy from convulsions; 49 died in early infancy, or were born dead; 75 were epileptics; 18 were idiots; 11 insane; 39 had paralysis; 45 had hysteria; and 6 had chorea; while 112 escaped free from any neurosis. Its indirect transmission, or transmission by metamorphosis of the neurosis, is more common still. In 124 epileptics the following diseases were found by Moreau de Tours[4] among the near relatives:—

Phthisis and scrofula	43 times.
Insanity	26 ,,
Epilepsy	30 ,,
Convulsions	25 ,,
Alcoholism	24 ,,
Apoplexy	18 ,,

These statistics differ somewhat from those prepared by Dr. Bourneville at the Bicêtre and the Salpêtrière, in which,

[1] Féré, *loc. cit.* p. 74. [2] *Ibid.*
[3] Eccheverria, *Journ. Ment. Science*, Oct. 1880.
[4] Quoted from Déjerine, *loc. cit.*

out of 350 epileptics, alcoholism in the direct ascendants heads the list with 51·6 per cent, followed by migraine with 24·5 per cent; epilepsy, 21·2 per cent; insanity, 16·8 per cent; and hysteria with 11·3 per cent.

The connection between epilepsy and the diatheses is not at first sight so apparent as is that of some of the other neuroses; but its connection with the tubercular diathesis becomes more apparent when we remember that a strong predisposition to the disease often exists when there is defective general development of the brain from any congenital influence, or when there is defect in cerebral structure, which is most frequently present in the offspring of neurotic families, and in the families of those who are markedly diathetic. The frequent association of the tubercular diathesis with idiocy and congenital imbecility, which, according to Ireland,[1] is present in two-thirds of all cases, is highly suggestive of the causative influence of the tubercular diathesis in arresting brain development, and thus causing epilepsy in a large proportion of cases. The frequent occurrence of rheumatism and of epilepsy in the same individual has often been noticed, and suggests the association of the arthritic diathesis in those cases.

Monstrosities and Malformations.—It is in virtue of heredity that the race is continued, and it is by heredity that an individual transmits to his descendants his innate or acquired characters. The defect of resemblance between ascendants and descendants is an indication of diminished vital energy, and of the commencing discontinuity of the race. In other words, the appearance of degeneration is a proclamation of the dissolution of heredity, and its established presence in the idiot or human monstrosity is the accomplishment of the process of degeneration—the last step prior to total extinction. The well-established fact of the occurrence in the same family of diathetic nutritive disorders (gout, diabetes, rheumatism, etc.), nervous affections, and malformations, is by no means a coincidence: it is but the expression of the general law of the transmutability of the neuroses, with this additional clause, that the incidence of the severity of the different

[1] Ireland, *Mental Affections of Children* (1898), p. 18.

neuroses varies indefinitely in different members of the same family.

The tendency to the transmission of single malformations is found to be constant in certain families: for instance, harelip, palatal deformities, malformations of the ear, spina-bifida, inguinal hernia, irregularities in number and formation of the fingers and toes, etc. Again, these deviations from normal structure are met with in a combined form in the same individual, and these are also hereditarily transmitted. Thus spinabifida combines with hydrocephalus, with club foot, or with imperforate anus. Hernias are found combined with malformations of the genital organs. Albinoism is met with together with cretinism, and alternates frequently with idiocy in the same family.[1]

The majority of hereditary malformations occur in neuropathic families, and are thus the result of the disordered functions of the nervous system. This remark obtains further confirmation in the fact that such malformations are most commonly met with and found in the greatest profusion among idiots and imbeciles, in whom the nervous heredity is most intense and accumulated. In these cases the brain itself is also often the seat of malformation, which implicates its histological elements, its vascular mechanism, and its anatomical conformation.

In his valuable work, *La Famille Nevropathique*, Féré devotes a chapter to the discussion of the dissimilar heredity of malformations, in which he has succeeded in showing that in certain neuropathic families malformations may occur different from or independently of their presence in the ascendants. "On consideration of the whole question," says Féré,[2] "we see that the stigmata of degeneration are teratological deformities. The minor deformities differ only in degree from the more evident monstrosities. If the degenerate fails to give birth to beings who resemble him, it is not because he has acquired the special faculty of transmitting qualities which he does not possess . . . as well as being deprived of morphological qualities, the degenerate is also deficient in biological

[1] Ireland, *loc. cit.* p. 227.
[2] Féré, *loc. cit.* p. 243.

and moral qualities. Morbid heredity implies physical ugliness, and physical ugliness is as common an accompaniment of intellectual decadence as of physical degeneration, for the reason that the one necessitates the other."

The occurrence of malformations, idiocy, and monsters in the families of the insane is, as may be supposed, extremely common. What has preceded has only one lesson to teach, namely, that insanity is a physical disease, *i.e.* one of the many manifestations of the neuropathic constitution, upon which it rests, and from which it springs. Further, that this diathesis is a degeneration which extends from mere disorders of metabolism up to the most profound nervous and physical abnormalities and the extinction of the race.

TABLE IV

GRANDFATHER, drunkard, died of delirium tremens.

MOTHER healthy, a little excitable, married a healthy man.

1	2	3	4	5	6
Daughter, melancholic, with tendency to suicide; married a tubercular husband.	Son, melancholic, with tendency to suicide; married a healthy wife.	Son, melancholic; died by suicide.	Son, neuralgic; married a nervous wife.	Son, caries of vertebral column at 26½ years.	Daughter, died at 5 years of cerebral abscess.
(*a*) Daughter, died of puerperal eclampsia. (*b*) Son, tubercular. Daughter, died at 1 year, of convulsions.	Several children, apparently healthy.	8 children, 2 of whom died of convulsions; 2 daughters neuralgic: 1 daughter had epileptiform attacks.	(*a*) Son, Morel's ear (helix absent). (*b*) Daughter, died at 1 year, of convulsions. (*c*) Daughter, sexidigital, slightly hydrocephalic. (*d*) Daughter, apparently healthy.		

(After Möbius.)

TABLE V

FATHER, healthy. MOTHER, psychopathic.

1	2	3	4
Melancholia. (*a*) Exophthalmic Goitre.	Nervousness and Diabetes.	Nervousness.	Imbecile.

MOTHER, neurasthenic, indolent, headaches; mentally peculiar. . . . Cousins. . . . FATHER, energetic, vigorous, mentally and physically. Later in life subject to depression and capricious.

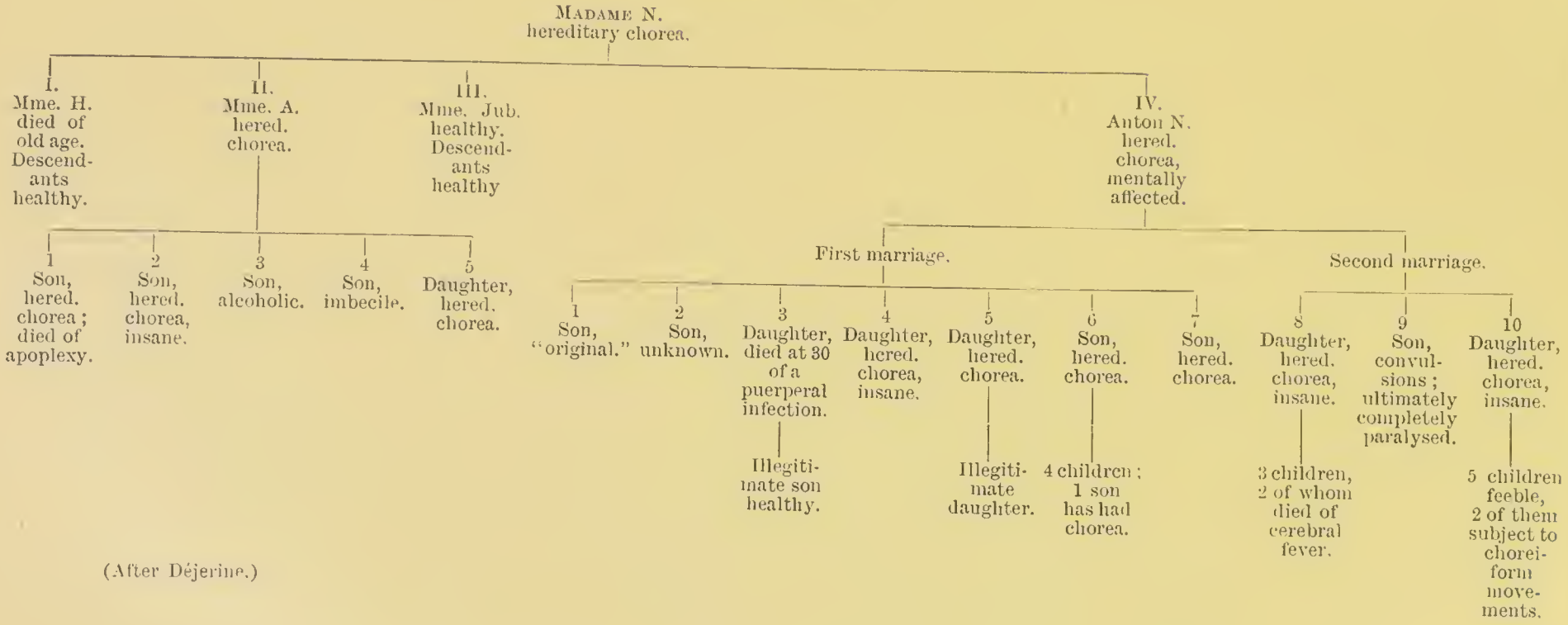
1	2	3	4	5
Daughter, morbidly nervous.	Daughter died, of puerperal fever.	Daughter, epileptic.	Daughter, nervous, with periodic melancholic attacks.	Son.

(After Möbius.)

TABLE VI

(After Déjerine.)

TABLE VII



(After Déjerine.)

CHAPTER III

DETERMINING CAUSES OF INSANITY

I. Social Causes

1. *Civilisation.*—The question of the presence or absence of insanity among savages is more complicated than at first appears. It is not so much that mental divergences from the normal type do not exist, as that they are probably not recognised. In the higher and more complicated states of society, where the social relationships become so intimate that the mental qualities of one individual form the complement of those of another, and thus a component part of the whole community, any pronounced irregularity in mental manifestation becomes not only intolerable to other members of the social community, but becomes detrimental to the harmonious working of the social machine. The acute constitutional forms of insanity are undoubtedly more common in civilised than in uncivilised communities. The absence of statistics among uncivilised peoples renders comparison impossible, and it must also be remembered that acute insanity in its incipient stages would be unrecognised by savages, and would most probably in more advanced stages lead the subject to an untimely violent end. Even in the present state of civilisation there are forms of mental aberration unrecognised by law and unnoticed by the general community; and it is therefore not to be wondered at that in a simpler and earlier civilisation many mental affections which would seem to us to be quite apparent should escape observation altogether, or be looked upon either as voluntary manifestations or as supernatural phenomena.

But when all these possibilities are discounted, there remains the fact that insanity is very much less common among savages than among modern civilised nations. With a population of about 6,000,000, Egypt has only one asylum at Cairo, which contains 600 patients. Compare that with Scotland, which has a population of less than 6,000,000, and 14,000 lunatics.

When a savage race comes into contact with modern civilisation, insanity increases rapidly. It was observed before the abolition of slavery in America that insanity was five times as common among the free northern negroes as among the still enslaved negroes of the south. At the present time insanity is equally common in the coloured and the white races in America.

While it is impossible, as has already been observed, to obtain with any degree of accuracy the comparative proportion of ordinary insanity existing among savages and civilised races, it is almost certain that alcoholism, general paralysis, and the generalised insanities, are far more common among the latter.

2. *Religious and Political Movements.*—Besides the complexity of life and the struggle for existence upon an immeasurably higher plane, civilisation introduces many accessory agencies, which are particularly prone to produce nervous degeneration. Among these agencies may be mentioned the emotions produced by new religious ideas, political crises, revolutions, and social movements, which sweep over nations at regular intervals, overthrowing older ideas, and considerably disturbing the usual atmosphere of existence. Not only does excitement of this kind really create insanity in descendants, but it also calls forth and accentuates the morbidity latent in a certain class, who only require this stimulus to push them over the precipice of mental instability.

3. *Education.* — The effect of education in promoting nervous degeneration is frequently discussed by popular writers on education and general socio-medical subjects. No doubt a certain number of children are so constituted that the effect of education and over-pressure is sufficient to retard mental evolution; but in many cases brain evolution ceases of itself prematurely just in those children who often show a bright

promise, and who of their own accord are most liable to overwork themselves in their desire for knowledge and advancement. While it may be admitted that over-pressure, if persisted in, must be ruinous even to healthy minds, the question is complicated by the consideration just mentioned. So far from over-pressure being a cause of insanity, it is more probable that in a civilised community insanity results more often from the want of suitable education than from too much education of any kind. On the other hand, insanity is most liable to occur among persons who earn their livelihood by brain work. Thus, apart from general paralysis, which is most common among soldiers and sailors, the liberal professions, including clergymen, lawyers, physicians, artists, and litterateurs, contribute a proportionally high number of sufferers.

II. Biological Causes

1. *Age.*—The predominance of cases of insanity in asylums whose ages are between thirty and fifty years has struck all observers, and the fact may be verified at any time by referring to one of the annual reports of any modern asylum, in which a table of ages is given. Yet these tables only indicate the absolute number of the insane of different ages in the asylum at a given time. In a table prepared by Esquirol,[1] it is shown that, while the general population diminishes quickly in number up to the age of twenty, then more slowly, but with increasing rapidity towards old age, the frequency of insanity compared with these ages is, on the contrary, always increasing, which shows that the more a person advances in life, the more liable he is to become insane. According to this observation, there are therefore, proportionally, fewer cases of insanity between the ages of thirty and forty than in old age, where the proportion relative to the population at the same age is enormous.

Insanity occurring in infancy is extremely rare, and apart from cases of idiocy or imbecility, which are chiefly congenital, very few cases of insanity in early infancy have

[1] Esquirol, *Des Maladies mentales*, ii. p. 674.

been recorded. Still, it is not infrequent to see recorded cases of insanity occurring before puberty. The protection of infants from the various more active causes of insanity, such as alcohol, hardships, and mental worry, is no doubt one of the reasons of their exemption, and another is, that the versatility and mobility of the ideas in childhood do not permit of the systematisation of any false impressions. And their closeness to nature, from which they directly derive their impressions, is defence against the invasion of their minds by pathological forms of thought. Notwithstanding these facts, infants of a neuropathic constitution are very subject to delirium on such slight occasions as mild febrile attacks, indigestion, accidents of all kinds, or mental shock. Such children are also subject to night terrors, vivid and terrifying dreams, painful nightmare, somnambulism, all of which assume in their manifestations a family likeness to insanity in the adult. Mania and melancholia have also been observed, as well as impulses to homicide, suicide, and fire-raising. At the age of puberty insanity becomes more common, and attacks of mania and melancholia—the former complicated by chorea, impulse, and hysteria, the latter by stupor—have frequently been recorded. The period of adolescence is always a critical one for those subjects who have an hereditary tendency to nervous affections. It is at this age that precocious dementia is most to be feared; and mania and melancholia, which are apt to recur with great frequency, tend to terminate in secondary dementia. It is at this period also that in the hereditarily degenerate those multiform manifestations of mental derangement, consisting of systematised delusional insanity, commencing suddenly and ending suddenly, or, it may be, indefinitely prolonged, most frequently occur. Such attacks may alternate with acute attacks of mania, melancholia, and stupor, ending finally in recovery or in dementia.

In adult age most of the common forms of insanity are met with, systematised insanity, general paralysis, mania, and melancholia. Finally, old age brings with it a special tendency towards dementia, which may supervene without any other bodily symptom, but which may be accompanied and complicated by cerebral hæmorrhages or softenings. Examples are

constantly met with, in which the mental faculties are maintained intact to a very late age. Therefore, old age of itself does not cause the mental infirmities with which it is so frequently associated. The subject of senile insanity must first of all be hereditarily predisposed to the neuroses, or to arthritism; or he must be the subject of syphilis, alcoholism, either acquired or hereditary, or of the various other agencies which act directly or indirectly upon the nervous system. In those senile cases in whom there is an hereditary predisposition to the psychoses, attacks of insanity, mania, or melancholia may be met with, differing in no respect from similar attacks at other ages of life.

2. *Sex.*—It will generally be found that the number of female lunatics in an asylum, with some exceptions, is greater than that of male lunatics; but this is no guide to the relative liability of the sexes to insanity, for it may be ascertained as a general rule that women live longer than men in asylums, and consequently their accumulation will be proportionally greater. Again, the duration of certain forms of curable insanity in females is longer than in males, which increases the length of the female residence, and consequently their existing numbers in asylums. But in order to test the frequency of insanity in the two sexes, care must be taken to ascertain the relative number of males and females in the general population before any true conclusion can be come to on this subject. If any area of the country is selected, it will be found, except in certain mining districts, that the proportion of males to the general population is considerably smaller than that of females. Notwithstanding the greater preponderance of females in the population, it will also be found, on careful investigation, that there is a decided excess of men in the numbers admitted into asylums over a given period. In tables constructed by Dr. Thurman,[1] he shows that in thirty-two British asylums there was an average excess on the side of the male sex of 13·7 per cent. The fact that women are less liable to be subjected to the various influences which directly cause insanity is probably an explanation of the less frequent occurrence of insanity in the

[1] Thurman, *Statistics of Insanity*, 1844.

female sex. Thus, general paralysis is far less frequent in women than in men. Alcoholism is also four times more frequent among men than among women. But general paralytics only remain in asylums for three or four years and then die, and most alcoholic patients recover and leave asylums after a comparatively short residence. From one cause or another, therefore, these two forms of insanity, which preponderate in the male sex, require shorter residence, which tends to diminish the actual number of males in asylums. M. Garnier[1] has established the fact that the mental affections to which men are most liable are the following, given in their order of frequency: Alcoholism, congenital degeneration, general paralysis, mental enfeeblement, epilepsy, mania, melancholia, senile dementia, and systematised insanity. The order of frequency in women, on the other hand, is as follows: Congenital degeneration, melancholia, mental enfeeblement, alcoholism, mania, general paralysis, senile dementia, and systematised insanity.

III. Physiological Causes

1. *Nutrition.*—The state of the nutrition of the body exercises great influence upon the functions of the nervous system, and consequently upon the mental manifestations. Prolonged hunger or thirst has the effect of producing distinct abnormal mental symptoms, such as hallucinations (especially of sight), delirium, and dementia. In those forms of malnutrition accompanied by exhaustion, which succeed serious bodily illnesses, mental diseases of a certain type are liable to occur. Even in lesser degrees of malnutrition of a chronic nature, the resistance of the nervous system is lowered, and the individual becomes more exposed to the various hostile influences which are so liable to unhinge badly nourished and consequently unstable nervous systems. The same condition may be produced by over-exertion, where there is not sufficient time given for recuperation by means of suitable food or sleep. In muscular over-fatigue, however, the element of auto-intoxication enters into the causation by

[1] Garnier, *La Folie à Paris*, pp. 24, 25.

reason of the large quantity of waste product thrown into the circulation.

On the other hand, mental troubles may be determined by over-alimentation, especially in the absence of sufficient exercise. In such cases the superabundant quantity of the nitrogeneous products not used up by the organism throw a greater burden upon the organs of excretion than they are able to fulfil. Not only so, but the glycogenic functions are imperfectly performed on account of the engorgement of the liver cells. Consequently it happens that when any disturbance of digestion occurs, the blood is rendered alkaline, and the uric acid becomes soluble in the blood-stream, producing a train of symptoms, chiefly of a nervous kind, which, according to Haig,[1] may end in epilepsy, melancholia, or any of the acute psychoses.

2. *Sleep and Dreams.*—Sleep is the great restorer of bodily fatigue, and is as necessary as food for the health and nutrition of the body. The connection between sleep and insanity is very intimate, and although the absence of sleep may quite possibly be a cause of insanity, the question is complicated by the fact that sleeplessness is one of the early symptoms of commencing insanity, and not a causal precursor. In most acute forms of insanity the function of sleep is impaired, and its restoration is generally a sign that the acute symptoms have passed away, and that the patient is either going to recover or become demented. With regard to dreams, it may be said that the abnormal sorts of them bear a close resemblance to some forms of insanity, especially to the hallucinations in acute alcoholism. The terrifying dreams of infants are most frequently neurotic stigmata; and the peculiar prolonged dreams of a vivid kind which are dreamt over and over again, night after night, or in different parts each night like a serial tale in a magazine, are only met with in mystic and highly neurotic individuals. A peculiar condition of hallucination is experienced by certain neuropathic subjects in the stage between sleeping and waking, which is known as hypnagogic hallucination. They generally occur in people who are in an exhausted nervous condition. The

[1] Haig, *Uric Acid and Disease.*

commencement of some of the acute insanities is marked by the frequent occurrence of vivid and terrifying dreams; and it has been observed by Maudsley and Moreau de Tours that towards the end of acute insanity, dreams become common, and that they indicate either recovery or the advent of a new phase of the disease. It has been clearly shown that certain obsessions, as well as systematised insanity of long standing, have had their origin in dreams. It will scarcely be held as possible by any one that in the absence of predisposition the dream could have originated the insanity; it is more probable that in highly predisposed persons the dream merely forms the starting-point of an abnormal train of ideas.

3. *Reproduction*—(*a*) *Sexual Functions.*—The influence of the healthy working of the sexual functions upon the mind and the nervous system generally, is too well known to require dwelling upon. We have already seen that the advent of the sexual sense at puberty, and its complete development at the period of adolescence, are attended in some cases by marked mental disturbance, in other cases by nervous symptoms or slight eccentricity in matters of conduct. But apart from the critical periods of life, the functions of the sexual system may be the cause of mental disturbance, owing either to excess or in certain cases to over-continence. It is highly improbable that any normally constituted individual ever suffers from excessive sexual indulgence, and in those cases in which sexual continence has been assigned as a cause of insanity, there will generally be found grounds for the belief that the subjects are otherwise highly neurotic. As a rule, masturbation and sexual excess are only met with in the neuropathic and the insane. Either the one or the other is one of the earliest symptoms of general paralysis, and is very commonly met with in cases of mania and melancholia. The absence of the normal exhaustion which succeeds the performance of the sexual act is sufficient to show that those persons who indulge to excess are abnormal, and careful examination will generally suffice to demonstrate that they are often of a neuropathic constitution. Much has been written on the subject of nymphomania, satyriasis, masturbational insanity,

and the causative connection between masturbation, sexual excess, and insanity. The truth is that abnormal eroticism, satyriasis, nymphomania, masturbation, and often prostitution are merely psychical stigmata of degeneration, and that masturbation is a frequent symptom, and not a cause, of acute insanity.

(*b*) *Menstruation.*—The function of menstruation is attended by certain well-marked changes in nutrition. The blood is rendered alkaline, and uric acid abounds in the blood-stream, producing all the symptoms of uric-acidæmia and auto-intoxication, which react unfavourably upon the nervous system. It may possibly be that the secretion of the ovary, which, like the secretion of every other essential gland, is necessary for the health of the organism, may, when poured into the system in excessive quantities, disturb the functions of the nervous system, just as the hypertrophy of the thyroid gland acts upon the nervous system in certain diseases, such as exophthalmic goitre. Some countenance is given to this view by the changes which take place in the system during prolonged amenorrhœa or after the menopause. General vitality diminishes, and in some cases senility begins; the skin becomes thickened, and slight mental enfeeblement, similar to that which is observed in myxœdema, is observed.

The appearance of menstruation at puberty has in a few cases been observed to be accompanied by mental disturbance, and in other cases a mental affection precedes the appearance of the menses, and disappears when they become established. The nervous disturbances which accompany menstruation in some healthy women are well known. In a few cases these disturbances take the form of obsessions or impulses. As a general rule, however, intellectual troubles in connection with menstruation are only observed in those cases in which the function is profoundly disordered, the menses being either suppressed for a long period, or occurring at irregular intervals, or accompanied by great pain and constitutional disturbances. The relationship of amenorrhœa to insanity is extremely complicated, because it cannot be definitely asserted in any one case whether the insanity is caused by suppression

of the function or whether the amenorrhœa is due to the advent of mental disturbance. It often happens, however, that the restoration of the function is followed by the return of sanity; but here again, cause and effect become complicated. The fact that during insanity the menses are in a great majority of cases suspended at the commencement or during the course of the malady is indisputable. In those cases in which menstruation proceeds throughout the course of the mental disorder, it is invariably observed that an exacerbation of the nervous disturbance occurs during the period of menstruation.

It is, however, at the time of cessation of the function of menstruation, which is known as the grand climacteric, that mental diseases, nervous affections, and mental peculiarities occur most abundantly in the female sex. Impulse of all kinds—to homicide, suicide, incendiarism, and theft—are not uncommon; and among mental diseases of all kinds which may occur at that period, melancholia is the one most frequently met with.

(*c*) *Puerperal Conditions.*—The puerperal state may be divided into three stages—pregnancy, parturition, and lactation. During pregnancy physiological changes of a distinct character occur in the blood and tissues. The fibrin is increased, while there is a diminution in the corpuscles and albumin, and the serum becomes less rich in solid material. These physiological changes have their counterpart in the mental condition, which in the majority of cases is considerably altered. The peculiar and sometimes depraved appetite, the eccentricities of character, caprices, "cravings," as they are sometimes called, as well as the exaggerated fears and antipathies of pregnant women, are popularly recognised. In highly predisposed and neurotic individuals these peculiarities may become exaggerated, and present themselves under various impulses or eccentricities of conduct which require supervision or isolation of the patient. Of the acute mental affections occurring during this period, melancholia is the most frequent (50 per cent); while mania occurs in a little over 30 per cent of all cases.

The mental disturbances occurring after parturition are of two kinds, namely, idiopathic and toxic. The ordinary idiopathic

acute insanities, mania, and melancholia, which are excited in predisposed individuals by the shock of parturition (45 per cent of the cases are first pregnancies), are frequently determined by some mental worry, by malnutrition, exhaustion, or loss of blood. Such attacks usually come on within four or five weeks after parturition. The most common form is mania, which occurs in about 50 per cent of the cases, and melancholia in about 40 per cent of the cases. There is nothing distinctive in the inception, course, and termination of the idiopathic insanities following parturition, except that there is a strong perversion of the maternal instinct, so that the mother becomes dangerous towards her own child. The excitement is a little more violent than is generally met with, and the bodily symptoms are characteristic of the puerperal state.

The toxic group of mental affections, which occur within a few days after parturition, are distinctly of infective origin. There is a tendency towards physical prostration with general febrile symptoms, and the lochial discharge is either arrested or offensive. Mentally the patients are neither exalted nor depressed, but labour under the confusion which is so characteristic of all toxic insanities. There is great excitement, with acute auditory and visual hallucinations.

Lactation causes insanity generally by producing a condition of physical exhaustion, accompanied by malnutrition and anæmia. Most of the subjects suffer from melancholia; but a considerable number from mania. Another group of lactational cases appear to arise after the weaning of the child, and in them the cause is probably toxic: and this is further demonstrated by the fact that insanity has been observed to occur owing to the sudden cessation, from any cause, of the milk secretion. In the latter group the symptoms are those of confusion, with hallucination, such as are met with in toxic insanity.

With regard to the frequency of the various forms of puerperal insanity, it has been definitely established that the insanities of pregnancy are the least common; that those of parturition form 50 per cent of the whole, and those of lactation about 30 per cent.

IV. Moral Causes

Moral causes act through the influence of the emotions. The emotions create nervous commotions, which range from conditions of slight excitement, as seen in pleasurable emotion, to extreme depression and even stupor. In this way their action, which is originally psychical, manifests itself in a distinctly physical manner, even to the extent of causing actual organic nerve affections and diseases of the most varied kind. They also influence nutrition, especially the nutrition of the central nervous system. Féré has divided emotions into two classes, sthenic and asthenic. The sthenic emotions are, as a rule, pleasurable; they increase energy, quicken the circulation and respiration, elevate the temperature, and increase muscular tension. The asthenic emotions produce exactly opposite effects. Yet the sthenic emotions, as well as the asthenic, may be followed by a depressing reaction and fatigue, more especially marked in neuropathic subjects; so that the operation of the emotions is complex. The sthenic emotions are not, as a rule, followed by any serious consequences, though there are examples of people fainting or even dying at the receipt of good news. The asthenic emotions, on the other hand, especially if persistently continued, are those which are invariably followed, in predisposed subjects, by most serious nervous complications. Almost every form of mental disease is preceded by a painful emotion, either as an exciting cause or as a preliminary symptom. In the causation of insanity disagreeable emotions may act in two ways: first by suddenly overwhelming the subject, very much after the manner of a physical shock. These quick and vivid emotions are usually followed by stupor or mental confusion; sometimes by a transitory form of mania, which passes off after a few hours or a few days as rapidly as they appeared. In other cases, again, the emotion is not immediately followed by any nervous disturbance. In cases of extreme fright, which often causes epilepsy or hysteria in young subjects, a considerable interval of time, especially in epilepsy, usually elapses between the occurrence of the fright and the first convulsive seizure. In the same way a violent emotion is often followed after a

long time by an attack of insanity. In these cases the emotion appears to have caused an acquired diathesis or tendency to insanity, exactly, as will be seen farther on, as the same tendency may follow a traumatic shock.

The second mode of action of painful emotion is where the persistent strain of some real or imaginary anxiety causes worry. In this case it is the persistence of the emotion which reacts unfavourably upon the nervous system. The consequent worry interferes with the functions of nutrition, disturbing digestion, preventing sleep, and excluding the pleasurable sensations which always accompany the healthy working of the organism. This, apart altogether from the depressive action of the emotions upon the cerebral circulation and the nutrition of the brain, facilitates in predisposed persons the advent of mental disturbance. Unfortunately in such cases the presence of one emotion of a painful character has a fatal tendency to engender a train of allied emotions, so that the whole mental life of the individual becomes clouded over. The form of mental affection which results from these consequences is not necessarily of a painful or depressing kind: and there is no constant relationship between the form of emotion and the mental disturbance which results from it. Lunier[1] has pointed out that the majority of the forms of insanity which occurred in Paris after the war of 1870-71 were of an exuberant kind, although all the causes were both depressing and debilitating.

V. Physical Causes

Man is particularly liable to be affected emotionally, and consequently in his mental disposition, by the natural physical surroundings in which he lives; by the climate, the seasons of the year, the amount of light and heat to which he is subjected, and more especially by his elevation above sea-level. It has all along been known that the inhabitants of mountainous countries have certain mental characteristics which distinguish them from those who live in low and flat countries. Lombroso[2]

[1] Lunier, *Annales Méd. Psych.* 1884.

[2] Lombroso, *L'Homme de Génie.*

states that in the plains genius is rare, and Renan has remarked that for the same reason Egypt possesses few men of superior intellect. According to Lombroso, though the inhabitants of mountainous countries are more intellectual, they are yet more liable to insanity. Meteorological influences always affect the nervous system, and their action is much more pronounced in persons of neuropathic constitution. These influences are particularly noticeable before and after thunderstorms, or according to the amount of moisture in the atmosphere. The seasons of the year undoubtedly modify the occurrence of insanity, apparently with different results in different places. The greater number of occurring cases of insanity appears to be in spring and in the late autumn. The number of suicides in Great Britain increases in an enormous proportion with the rising temperature of the summer months, and reaches a climax in July, which is the hottest month of the year in this country. Gouzer [1] has attempted to show that it is not so much the action of climate or the latitude in which they live which influences mankind, as the amount of light to which they are habitually exposed. He has attempted to prove by elaborate charts and tables that the proportion of suicides, of crime, and of insanity, depends in different ratios on the amount of light to which the population among which they occur is subjected. The influence of the moon upon meteorological conditions may in part explain its alleged effect upon the insane and the exacerbations of acute insanity. From this influence we have the word "lunacy." It has been affirmed that there is always a grain of truth in popular superstition; and it must be admitted that to some degree the changes of the moon influence the course of mental disease, although the matter has never been satisfactorily explained. Lombroso has observed an undoubted connection or an habitual coincidence between the appearance of the new moon and exacerbations in certain mental diseases, more especially among epileptics. The effect of light and of colours upon healthy and diseased minds has recently been demonstrated, and it is now well known that red augments nervous activity, increases vitality,

[1] Gouzer, *Arch. Anthrop. Crim.* 1891.

and tends to aggravate the mental condition of maniacal patients, while violet and blue have a tendency to depress vitality, and to calm the agitation of excited patients.

The effect of traumatism, especially injuries to the head, in the causation of mental disease, is very considerable and important. The insanity which follows head injuries has been divided by Krafft-Ebing into three classes: (1) the cases in which the insanity immediately follows the accident; (2) those in which there is an intermediate prodromal stage, of longer or shorter duration, characterised by changes of disposition and character; (3) those in which the injury creates a predisposition to mental disease, an acquired diathesis, the insanity occurring only when some exciting cause starts it.

Sunstroke causes insanity in a way very similar to traumatism, when the direct rays of the sun beat upon the body, especially upon the head (*coup de soleil*). On the other hand, excessive heat, whether solar or artificial, may produce similar symptoms (*coup de chaleur*). Such cases occur in firemen and stokers on large steamers, and among persons serving in large, overheated kitchens. The forms of insanity immediately following sunstroke or heat are similar to those occurring after traumatism. They are of the confusional type, with hallucinations of the senses and impulses towards homicide and suicide. Sunstroke may also give rise to an acquired diathesis or predisposition towards mental diseases.

VI. Intoxicants

The poisons which act upon the nervous system, causing disorder of its functions, although numerous, have not as yet by any means been all elucidated. The toxic basis of all forms of insanity is a presumption for which there is fairly good foundation, but no direct proof. Indeed, the existence of those poisons, regarding which there is almost a certainty, in certain cases of mental disorder, eludes chemical detection. Many of them leave behind them no sure pathological traces by which their action can be identified; and they do not always produce characteristic clinical symptoms. There is, however, every reason to believe that the field of toxic nerve

disease is one of the most extensive in morbid psychology, and that it is because we are still on the threshold of inquiry that its recognition is not more general.

The toxic substances which are associated with the causation of mental disorder are divided into three great classes: (A) those which arise from the morbid products of metabolism within the body itself—these are known as auto-intoxicants; (B) those which are due to the infection of the blood or tissues by micro-organisms, which multiply in the blood, and whose poisonous products injuriously affect the nervous structures; (C) organic or inorganic poisons introduced into the system voluntarily or by accident.

A. Auto-Intoxication

(*a*) *Physiological Instability.*—We have already seen that the morbid diathetic changes in nutrition are capable of engendering trains of symptoms and diseases in various organs of the body, including the nervous system.

What takes place over many generations by slow gradation may also occur in the individual in whom the relationship between waste and repair of the tissues has been from any cause profoundly disturbed. It must, however, be admitted that the action of the products of disordered metabolism most usually manifests itself in persons who are predisposed by heredity to suffer from nervous diseases. In a normally constituted individual there is an exact balance between waste and repair of the tissues, and the healthiest individuals are those who can adapt themselves, who can regain the nutritive balance amidst constant changes in the surroundings. In less normal individuals the balance is more easily disturbed. If, for instance, there is a deficiency of alimentation, the cells, and especially the nerve cells, instead of regaining their nutritive equilibrium, become exhausted and irritable; consequently sleep is diminished. Sleep is the natural consequence of exhaustion, and the great repairer of waste: during it the process of metabolism is checked, few waste products are formed, and an opportunity is given for the removal of those already formed; but with deficient sleep, waste products

are increased, the nervous system becomes thereby toxically influenced, and the resulting condition of exhaustion and emaciation becomes more profound. In starvation, in severe hæmorrhage, and in extreme wasting diseases, a similar condition prevails; and it not unfrequently terminates in delirium, characterised by constant restlessness, absolute insomnia, vivid hallucinations, and incoherent talking. Cases have been observed in which the symptoms were clinically very similar to acute alcoholism. In its more advanced forms this has been described as the delirium of inanition.

(*b*) *Defective Metabolism.*—Another group of metabolic changes, which result in the formation of toxins injurious to the function of nervous structure, are those in which there is a deficient destruction of the primary products of metabolism, followed by their accumulation in the system. As examples we have biliary lithiasis, due to the deficient oxidation of certain organic acids, which diminish the alkalinity of the blood, extract the lime salts from the tissues, and consequently precipitate cholestrin from the bile; the insufficient metamorphosis of the fats producing obesity, of sugar causing diabetes, and of the nitrogenous substances, resulting in gout and rheumatism. With each of these and allied conditions are associated distinct nervous symptoms, due perhaps to the action of the products of defective metabolism upon the nervous system. Mental disturbances are frequently associated with biliary calculi, and these calculi have been found by some observers to be twice as common in the insane as in the sane. The nervous and mental disorders associated with diabetes have been fully investigated and shown to be of great variety, and sometimes of great intensity. Symptoms of nervous and spinal diseases, similar to general paralysis and locomotor ataxia, not infrequently appear in diabetic subjects, and have been known to proceed to the full establishment of serious organic changes in the brain and spinal cord. Purely mental symptoms, such as delusions of persecution, obsessions, and impulses, have also been observed. It is possible that both the diabetes and the mental symptoms may in some cases have a common origin; but in the great majority of cases there is no nerve lesion to account for the appearance

of glycosuria, the mental aberrations being possibly due to the toxic influence of defective metabolism.

The association of gout with nervous troubles is historical; so much so that attempts have been made to describe a gouty psychical condition, characterised by hypochondria, irritability, defective power of attention, and a changeable mental condition. There is undoubtedly an alternation between the nervous and the articular symptoms of gout, the one, as it were, replacing the other. Among the mental disorders which follow gout, or which may replace it, a condition of melancholia or great depression of spirits, with hallucinations, may be mentioned. Occasionally maniacal attacks supervene; and in certain subjects mental enfeeblement, with loss of memory, aphasia, and a difficulty of articulation, not unlike that met with in general paralysis, has been observed. What has been said of gout equally applies to rheumatism. The cerebral affections have been divided into three classes in acute articular rheumatism: (1) those which occur contemporaneously with the rheumatic attacks or the fever, and present the symptoms of delirium, great restlessness, and hallucinations. Such attacks used to be associated with the old conception of the metastasis of the rheumatic affection from the articular membranes to the cerebral membranes — a theory which received some support from the fact that meningitis has often been found in such cases, and that during the cerebral symptoms the inflammation of the joints declined; (2) those in which the mental manifestations alternate with the articular symptoms; and (3) those in which the insanity succeeds the rheumatic attack.

CHAPTER IV

DETERMINING CAUSES OF INSANITY—*continued*

VI.—INTOXICANTS—*continued*

(*c*) *Defective Gland Secretion.*—The pathology of the glands of the body and their influence upon nutrition and the nervous system have only been recently discovered. The results of the removal or of the destruction by disease of the essential glandular organs of generation, the testicles and ovaries, have all along been recognised by the peculiar train of changes which takes place in the respective characteristics of each sex. Not only is the appearance of the body, and to a certain extent its nutrition, altered, but various changes of a functional nature occur in the nervous system, especially in the mental sphere.

The discoveries of Mr. Victor Horsley in this country and of other workers abroad regarding the functions of the thyroid gland, and the pathological changes—disease or hypertrophy—which follow its removal, have opened up a new field of pathological inquiry of the greatest significance in the domain of neurology. Three distinct forms of disease, which seriously implicate the nervous system and its higher mental functions, are always associated with, if not directly due to, pathological changes in the thyroid gland. These are cretinism, exophthalmic goitre, and myxœdema.

The change in the thyroid gland in cretinism may be of two kinds. It may be either atrophied; or it may be hypertrophied, owing to the replacement of the essential gland structure by a new growth of tissue. In both cases the function of the thyroid gland is seriously implicated, and

the resulting cretinism shows itself either congenitally, or as a disease commencing in early childhood. In the congenital cases which survive birth the children are highly degenerate in their physical configuration; the body is large, and the subcutaneous tissue appears to be œdematous; there is irregular development of the facial and cranial bones, with flattening of the features, which gives them a stupid, idiotic appearance. As the child approaches puberty there is also evidence of arrest of intellectual development. In those cases in which the cretinism appears in early childhood, the bright normal expression becomes gradually lost, together with the intelligence, and the physical characteristics which have been alluded to in connection with congenital cretinism make their appearance.

Mr. Horsley has shown experimentally that, provided the gland is removed in monkeys with all aseptic precautions, the myxœdematous condition is produced, and there ensues an advanced condition of hebetude, in which the atrophic condition of the tissues above noted occurs, and the animal ultimately dies, presenting all the appearances of advanced cretinism.

Exophthalmic goitre is intimately allied to the neuroses, and occurs most frequently in the female sex, and in anæmic and hysterical subjects. The disease presents various points of similarity, and of antithesis, to the cachexia which follows the removal of the thyroid gland. The points of difference are that in the myxœdematous cachexia there is a slow heart beat, while in Grave's disease the heart action is rapid: in the first there is a cold, thick, and dry skin: in the second a warm, clear skin, inclined to sweat; in the first there is slowness and dulness of the intelligence; in the second increased mental excitability, accompanied by weak mental irritability. The symptoms in Grave's disease, as has been pointed out by Professor Greenfield, are more in accordance with the theory that instead of arrested secretion there is increased and, at the same time, altered secretion of the thyroid gland. Two facts support this view: first, that many of the symptoms are analogous to those caused by the administration of full doses of thyroid extract; and, second, that cases of Grave's disease have been shown to

benefit by administration of that drug. Besides the symptoms of irritability and excitability, and other affections of the mental disposition, mania and melancholia, separately or alternating with each other, occur in some cases. In all cases in which the association of exophthalmic goitre with insanity has been recorded, the symptoms have been variable, "generally commencing with depression, followed by restlessness, incoherence, volubility, destructiveness, and sleeplessness; and these symptoms are associated with change in the appetite, and are frequently accompanied by vomiting or diarrhœa." [1]

Myxœdema depends upon the destruction or loss of the thyroid gland, either due to atrophy following on inflammation, or to the substitution of a delicate fibrous tissue for the proper glandular structure. The disease occurs most frequently in women about forty or fifty years of age. The features become broad and flattened, the lips large and thick, and the subcutaneous connective tissue is apparently greatly increased. The hair comes out; the temperature falls below normal; the hands and feet become broad; the speech drawling and slow; "the mind," according to Sir William Gull [2] (who first directed attention to the condition), "which had previously been active and inquisitive, assumed a gentle, placid indifference, corresponding to the muscular languor, although the intellect was unimpaired." In a large proportion of cases, however, there is, more or less, imperfection of the mental processes; memory is defective; speech and writing uncertain and slow; and in some cases placidity alternates with outbursts of fretfulness and irritability. When the disease becomes advanced, delusions, hallucinations, and actual insanity occur in about one-half of the cases. The insanity takes the form of acute or chronic mania, or melancholia, with delusions of suspicion; in the maniacal cases delusions of exaltation are frequent.

The functions of the pituitary gland appear in many respects to be analogous to those of the thyroid, and the result of its extirpation has a decided effect upon the degeneration of nerve function.

[1] Savage, *Tuke's Dict. Psych. Med.*
[2] Gull, *Trans. Clin. Soc.* vii. 1873.

(*d*) *Auto-Intoxication from the Alimentary Tract.*—The researches of Bouchard[1] on this subject have clearly demonstrated the frequency of infection of the system by ptomaines and other poisons originating in the stomach and intestines. In almost all cases of melancholia and hypochondria, dilatation of the stomach is present, and in many cases the resulting dyspeptic disorders will be found to have existed prior to the commencement of the insanity. Dilatation of the stomach supplies the most favourable conditions for the production of the phenomena of auto-intoxication. The alimentary materials, incompletely subjected to the natural digestive processes, develop putrid fermentations, from which arise toxins of many kinds, of a poisonous and deleterious character. If, for any reason, these toxins are over abundantly produced, insufficiently eliminated or destroyed within the system, intoxication sets in. In predisposed persons the nervous system suffers quickly, and there occur vertigos, syncope, intellectual languor, depression of spirits, and even hallucinations of sight. Bouchard has recorded cases in which hypochondriacal ideas and suicidal tendencies were evidently connected with dilatation of the stomach. The beneficial effect of the administration of antiseptic remedies, such as salol, calomel, naphthaline, iodoform, and carbon, and of the washing out of the stomach in cases of melancholia, is now generally recognised. The probability is that a large number of cases of acute mania are due to auto-intoxication from the intestinal canal; but on this point there is as yet not sufficient evidence. Leaving out of account the mental disturbance, so variable in each patient, many of the physical symptoms in insanity bear a close relationship to those met with in cases of intestinal obstruction, in which the toxic element predominates. These are elevation of temperature, frequency of the pulse, cold, viscid perspiration, an earthy colour of the skin, extreme fœtor of the breath, dilatation of the pupils, coldness of the extremities, sometimes muscular cramps, prostration or collapse. The cutaneous eruptions and boils which are met with in acute mania, especially towards convalescence, and the scarlatiniform spots, which Schüle has met with in certain

[1] Bouchard, *L'Auto-intoxication.*

cases, all these and many other symptoms occur in intestinal intoxication, as well as in acute mania, and are the expression of a toxic condition in the blood and tissues. Finally, the mode in a few cases in which the period of acute insanity terminates by diarrhœa, polyuria, or ptyalism, is suggestive of means used by nature to eject poisons from the system.

(*c*) *Auto-Intoxication from the Liver and Kidneys.*—In health the liver exercises the following functions: (1) the purification and the excretion of the blood pigments by transforming them into the colouring matter of the bile, and discharging them into the bile ducts and intestines: (2) the transformation of albuminoid substances into urea, and their elimination through the blood channels and the kidneys; (3) the transformation of sugar, starches, and certain albuminoid substances into glycogen; (4) the arrest and destruction of poisons, mineral and organic, and the consequent protection of the system from the products of chemical elaboration during digestion and absorption.

The liver receives albuminoid matter from the alimentary canal through the portal vein, and it also receives from the general circulation other albuminoid matters of various kinds, modified in the process of nutrition and otherwise. These albuminoid substances are all in a colloid condition, and are transformed by the action of the liver into a crystalloid form —in other words, into urea: but between the final product—urea—and the colloid-albuminoid there exists a series of intermediary chemical bodies, leucin, tyrosin, xanthin, hypo-xanthin, and ammonia. These may be eliminated as such by the kidneys: and albumins, in various degrees of coagulation, may also be present in the urine. Now, the presence of all these last-named bodies in the urine is due to defective assimilation and transformation on the part of the liver. They are not in themselves toxic to any marked degree, yet they exercise a destructive action upon the renal epithelium and the glomeruli of the kidney, which prevents the proper action of these organs and the elimination of the poisons from the system. Further, we do not at present know whether uric acid is an intermediary product between albuminoids and urea, or whether

it is caused by the destruction of nuclein albumins; but in any case it is a fact that the augmentation of uric acid in the urine is an indication, often an early one, of hepatic insufficiency. Hepatic insufficiency in its relation to the transformation of albuminoids into urea is always attended, as Bouchard has pointed out, with hypertoxicity of the urine.

Another and important form of hepatic insufficiency is connected with a disturbance of the arrestive functions of the liver. The gland loses its power of arresting or destroying the normal poisons of the organism, and in particular those which arise from intestinal putrefaction. There result various disturbances of the system, due to auto-intoxication, accompanied by a hypertoxicity of the urine, and later by irritative affections of the renal epithelium, especially the epithelium lining the glomeruli, and the convoluted tubules.

Hepatic insufficiency, so far as concerns the functions of assimilation and dissimilation, is accompanied by the morbid production of uric acid, albumins, badly organised sulphur compounds, extractive substances in abnormal quantity, lactic acid and salts of ammonia. These are the substances which produce hypertoxicity of the urine, toxic affection of the renal epithelium and albuminuria.

In the loss of power of destroying organic intestinal poisons, the liver permits the passage of the following substances into the blood: ptomaines, alkaloids, putrefactive products and salts of ammonia, combined with carbonic or carbamic acids. These substances produce various forms of auto-intoxication, and augment the hypertoxicity of the urine. Similar conditions are also caused by insufficiency of the function of biliary secretion. The incomplete and vicious transformation of the pigmentary waste material allows the passage into the blood and urine of biliary pigment, toxic salts of the bile, and especially potassium salts, which, according to Bouchard, are the most toxic of all. From the infection of the system by these poisons various nervous symptoms arise. Headache, malaise, delirium, epilepsy, and other cerebral symptoms have been attributed to hepatic insufficiency. Recently several observers have succeeded in demonstrating the close causal relationship which exists between hepatic

insufficiency and certain mental affections, especially Klippel,[1] who has shown the frequency of symptoms conclusive of hepatic insufficiency in acute insanity, toxic insanity, and alcoholic insanity, where, in the latter, these symptoms existed in the absence of every sign of hepatic cirrhosis. In alcoholic insanity of hepatic origin, he has shown that the hepatic cells, altered in their function and organic structure by the action of alcohol, become powerless to prevent the passing of poisons into the blood, or their destruction in the organ itself. In the cases which he has reported, the insanity occurs after the imbibing of alcohol has been stopped. In some of the cases, after death there was found to be no cirrhosis of the liver, but a fatty degeneration of the organ and of its lobules. The poisons which act upon the liver and produce insufficiency are by no means limited to alcohol; out of many examples may be mentioned poisoning by phosphorus, with destruction of the liver cells, followed by insanity, not immediately subsequent to the ingestion of the poison, but to the destruction of the hepatic function. Finally, in every destructive lesion of the liver, or arrest of hepatic function, whether caused by alcohol, mineral poison, or by poisons of infectious fevers, delirium or insanity may occur.

Renal insufficiency is, as we have seen, frequently caused by hepatic insufficiency, from which arises a double source of auto-intoxication; but the kidneys may primarily break down and become inoperative. The result of that is usually rapid uræmic poisoning, accompanied by coma and death. When the renal insufficiency is less marked, auto-intoxication undoubtedly results from the accumulation of waste products in the blood: but here there is a complication with hepatic insufficiency, secondary to renal incompetency.

Many cases have been recorded of insanity occurring in the course of Bright's disease and other acute kidney affections; but there appears to be no connection between the form of the insanity and the uræmic poison. In certain cases of albuminuria, especially in pregnancy, convulsions of an epileptic nature are well known to occur.

[1] Klippel, *Arch. de Méd.* 1892, and *Annales Méd. Psych.* 1894.

B. Intoxication from Micro-Organisms introduced into the System

Insanity may occur during the course of one of the continued fevers, or allied diseases of infective origin, and as a sequela of the attack (post-febrile insanity). When insanity occurs in the course of a fever, it is almost invariably in predisposed persons; but in a large proportion of cases there is a tendency, varying with the individual idiosyncrasy, to disordered mental action, usually called delirium. There are two distinct types of delirium in acute febrile affections: (*a*) a low muttering form, in which the patient lies still and more or less regardless of what is going on around him, or if external impressions do affect him, they are distorted into illusions and form the groundwork of incoherent mutterings; (*b*) the wild or raving form, which is a much more active state. The patient is noisy and incoherent, and apparently heedless of his environments. He is often violent and resistive, and requires to be forcibly restrained. The amount of delirium exhibited by a patient would appear to be irrespective of the temperature, although in such cases the temperature is usually pretty high. It varies considerably, however, with the form of fever, being more pronounced and more generally met with in severer exanthemata, such as typhus and small-pox. In the less acute fevers, such as typhoid or measles, as a rule the symptoms of delirium quickly pass away after the crisis has been reached or passed; but in some cases, especially in typhoid fever, in which there is occasionally a delusional form of delirium, it is prolonged into an insanity, which persists after the subsidence of the fever, and even after convalescence. In intermittent fever there is often slight delirium in the hot stage. According to Griesinger,[1] in localities where intermittent fever is endemic, certain individuals, instead of suffering from ordinary ague, are attacked by an intermittent insanity. These attacks correspond in their duration, periodicity, and increase of temperature, with the character of the endemic fever. Fleming, quoted by Griesinger, records the case of a young man in

[1] Griesinger, *Mental Diseases*, New Syd. Soc. Ed. p. 182.

whom the intermittent fever took the following form. He had five attacks of mental disorder, one every other day. The attack commenced after very slight rigors, with an indescribable feeling of pain in the cardiac regions, and palpitations, which rapidly increased to a state of extreme anxiety. This formed the commencement of the delirium, out of which, after a deep sleep, the patient emerged bathed in perspiration. He soon recovered under the treatment for intermittent fever. In influenza, quite apart from the subjective nervous and mental sensations accompanying the attack, there is often a tendency to delirium at the very outset of the disorder. Delirium is common also in certain cases of pneumonia, especially in alcoholic subjects, but without the complications of alcoholism. There are a few persons in whom delirium of pneumonia is more marked and excessive than in any other acute affection. One of the most remarkable and extreme forms of delirium met with in acute affections is that seen in acute rheumatism. In such cases there is usually hyperpyrexia, which makes it probable that the poison located in the joints has become more soluble in the blood-stream, and is exerting its deleterious influence upon the nerve centres, causing delirium, coma, and increased temperature. When patients suffering from delirium and hyperpyrexia in acute rheumatism are placed in a cold bath, the joint affection returns, the temperature falls, and the delirium disappears.

In certain cases of blood poisoning due to septic causes, whether or not pyæmia or septicæmia exists, delirium occurs, which varies in intensity and duration with the predisposition of the individual to mental affection or to the presence of some complication, such as alcoholism. In those cases of puerperal insanity of infective origin which occur very shortly after parturition, usually within two or three days, the clinical symptoms point unmistakably to their identity with puerperal septicæmia. The disease reaches its climax very rapidly; the lochial discharge is either arrested or offensively fœtid; there are rigors, increase of bodily temperature, a tendency to prostration and to pulmonary congestion. Occasionally there are distinct inflammatory changes in the pelvis, with perhaps peritonitis, abdominal distension, and tenderness.

Such cases may end fatally by blood poisoning of an acute kind, or more slowly in one of the pyæmic forms of puerperal fever. In others the inflammatory symptoms are more slight, but they are almost always present. Indeed, it is seldom that two precisely similar cases are met with, and exactly the same remark applies to the varieties and degrees of puerperal septicæmia. The greater immunity of cases of puerperal insanity from inflammatory symptoms is difficult to explain; but it is probably analogous to the cessation of the articular inflammatory changes when acute cerebral rheumatism supervenes. The variety in the symptoms of puerperal septicæmia and of infective puerperal insanity is probably due to the diversity of the forms of infection—that is, of the kind of micro-organism which finds its way from the genital tract into the circulation and the tissues of the body. It is now generally recognised that the organism may be one of several, either a streptococcus, or the micrococcus pneumoniæ crouposæ, or even the bacillus coli communis. The latter organism appears, in mixed affections, to owe its virulence to the presence of other organisms; for alone it seems to be less harmful than when stimulated by the toxin of co-existing germs.

In 1864 Dr. Hermann Weber[1] described a delirium of acute insanity occurring during the decline of fevers and acute diseases. He called it the Delirium of Collapse. The diseases in which he had observed it most frequently were typhoid fever, typhus fever, pneumonia, especially of the apex, acute rheumatism, erysipelas, and cholera. It has also been frequently observed, more especially in recent years, after influenza. The same mental affection has also been observed to occur after surgical operations, either gradually or suddenly without any warning. Dr. J. C. Simpson[2] states that the average time for the appearance of the symptoms, reckoned on nearly 200 cases, is the fourth day after operation, and after the subsidence of the pyrexia. The prevailing mental condition is one of confusion with delusions, and very frequently hallucinations. The physical condition is one of extreme debility, nervous

[1] Weber, *Med.-Chir. Trans.* Lon. (1865), p. 135.
[2] Simpson, *Jour. Ment. Sc.* (Jan. 1897), p. 86.

exhaustion, malnutrition, and feeble or disordered functions. As a rule, the severity of the primary affection greatly modifies the gravity of the mental disturbance, both in its intensity and its duration.

In chronic wasting diseases, such as tuberculosis, in various cachexias, persistent loss of blood, or chronic suppuration, similar mental conditions, but of a chronic character, are met with. Anæmia plays a very important part in the production of such neuroses, and in the great majority of cases the mental disturbances are modified by treatment of a nutritive and restorative kind. In such conditions the physical affection distinctly modifies the mental disturbance, rendering it either chronic or acute, and consequently altering the manifestation of the mental symptoms; but it has not by any means been proved that the insanity which is accompanied by any special physical disease, such as tuberculosis, presents any peculiar character. It is quite conceivable that in chronic constitutional disease the structural alterations which are liable to occur in the brain of some cases distinctly alter the character of the insanity; but in such cases the alteration is due to the neoplasms and not to the constitutional affection.

In post-febrile and post-surgical insanity, and in those forms of insanity which accompany chronic bodily diseases, the primary cause must be assigned to changes of nutrition which weaken the nerve centres and especially the cerebral cortex; but in reality the most important cause is the secondary intoxication of the exhausted nerve centres by ptomaines, the result of disordered nutrition or of microbes. The type of insanity caused by intoxication is always that of mental confusion, and that is the type which almost invariably prevails in the class of mental diseases which are now being referred to. The question as to whether these ptomaines continue to act during the whole course of the disease or only at the commencement has not been satisfactorily settled. An attempt has been made to discover whether the ptomaines exist in the urine, and in some cases they have been demonstrated in large quantity; but the presence of ptomaines in the urine does not of course decide whether such poisons are the cause of the insanity. Dr.

Chevallier Lavaure[1] analysed the toxic action of the urine of the acutely insane, according to Bouchard's method, and demonstrated that in such conditions, especially in acute mania, the urine loses a large proportion of its toxicity, most probably through the insufficiency of the eliminating action of the kidney. While an average of 25 ccms. of normal daily urine and 35 ccms. of normal night urine are required per kilog. to kill an animal, 60 ccms. of maniacal daily urine and 69 ccms. of maniacal night urine are required to produce the same effect. With the exception of some cases subsequent to surgical operations, it must be admitted that there is as yet little direct proof beyond the distinctive clinical appearances of the symptoms, that this class of insanity is directly caused by poison acting upon the nerve centres.

There are also cases of mental confusion consecutive to traumatisms, sunstroke, even to acute attacks of insanity, to sudden frights and moral shocks, in which, although there is no positive evidence of auto-intoxication, the mental symptoms are those of confusion, and the physical symptoms are those of profound disorder of nutrition. Some experiments by Charrin and Roger certainly tend to confirm the assumption that in certain cases of mental confusion, subsequent to severe shock to the nervous system, auto-intoxication plays an important *rôle*. The following among others may be given as an example of these experiments. A rabbit was placed on a revolving table, which was kept in rotation for four hours. An immediately previous examination of its blood showed it to be free of all micro-organisms; after revolution a second bacteriological examination was made, and the blood was found so rich in bacteria that from one drop 800 colonies were developed. In the same way it is assumed that fright, shock, and violent disturbances of the nervous system may cause a cessation of the activity of the nutritive centres of the brain. Bouchard has shown that nervous inhibitory influences suspend the normal process of phagocytosis, which is the function of the lymphatic cells in their struggle with micro-organisms, and that the blood of animals which have been subjected to a

[1] Chevallier Lavaure, *Des Auto-intoxications dans les Maladies mentales*, Bordeaux, 1890.

gradual process of cooling in a refrigerator, or to starvation, becomes rich in micro-organisms, which can easily be reproduced by culture.

If these experiments have any bearing on the problems of human pathology, and I believe they have, it seems probable, not only from analogy, but also from clinical symptoms, that auto-intoxication is one of the factors which produce insanity in asthenic cases, especially in those who have been subjected to fevers, operations, accidents, and mental shocks of a severe kind.

With regard to traumatism and sunstroke, the analogy of the symptoms and their causation with the remarks which have just been made is somewhat suggestive; using the word "traumatism" in its broadest sense, so as to include surgical operations. Le Dentu [1] has found that in 68 cases of post-operative insanity, 38 of these, or more than one-half, were operations on the female genital organs, 14 of these being ovariotomies. The remaining 30 cases comprise all forms of operations. It has been asserted by some that other pathogenic factors enter into the causation of post-operative insanity. Hereditary predisposition to insanity is probably always present. Alcoholism is believed by many writers to be one of the most important predisposing factors; but many cases have been recorded which presented symptoms similar to acute alcoholism without any suspicion or evidence of previous indulgence in alcohol. The various drugs used to produce anæsthesia and to prevent sepsis, such as chloroform, ether, morphia, and iodoform, have also been incriminated. The infection of the system by micro-organisms or their toxins has been suggested, as have also the numerous nutritive reactions which follow operations, and which produce a train of symptoms often ending in organic lesions.

In the concussion which follows the direct application of force to the head, there is first of all collapse, which in some cases may approach a condition threatening immediate death; this collapse, with complete unconsciousness, may last several hours. After this comes a stage of reaction, or of vaso-motor paresis, with drowsiness or sleep, which may last for a day or

[1] Le Dentu, *La Médecine moderne*, 1892.

a week, and the last stage is one of convalescence or recovery. During this last stage the patient is fatigued, torpid, and unfit for mental or physical effort. Some of the symptoms of the state of convalescence may persist for years, as nervousness, inaptitude for business, liability to headache, a peculiar susceptibility to the influence of stimulants, change of mental disposition or insanity. That morbid changes of nutrition follow such a sudden shock to the nerve centres is undoubted; and that they bring in their train auto-intoxication, whether chemical or microbic in origin, is highly probable.

If we study the symptoms of sunstroke, or rather heat-stroke, we find that they almost invariably occur in persons of disordered health, whether caused by dissipation, over-fatigue, or any other cause which depresses nerve power. When such people are exposed to the effects of heat, whether of the sun or in heated rooms, hospitals, barracks, tents, and even ships, they are liable to suffer from heat exhaustion, which may pass into the dangerous condition of heat-stroke. That the rays of the sun beating upon the head or body are not a necessary cause is shown by the fact that cases occur most frequently in houses or ships by night or by day, away from the direct solar rays. *Post-mortem* examination of cases which succumb, shows that the whole venous system is engorged, and the body marked by petechial patches or extensive ecchymoses of a livid appearance. The blood is generally more fluid and grumous than usual; its coaguability is impaired, and it is acid in reaction; the corpuscles are somewhat crenated and have less tendency to form "rouleaux" than in the normal condition; *rigor mortis* comes on very rapidly from early coagulation of myosin. There is no special affection of the brain or its membranes discoverable, except in very severe cases as a secondary change. The clinical symptoms are those of fever, with prostration, collapse, sometimes hyperpyrexia, dyspnœa, occasionally convulsions and coma. In these *post-mortem* and clinical symptoms we have a picture in every respect identical to that of a toxic fever; and there is here much less dubiety in forming the assumption that heat, acting upon an already depressed and fatigued system, has arrested its nutritive functions and destroyed the phagocytosis of the tissues, and

permitted the auto-intoxication of the organism in the same way as was shown in the experiments of Bouchard.

The action of the syphilitic poison in the direct causation of acute insanity is a disputed point. It has been affirmed by Ball, Skae, and Clouston, and denied by many modern writers, including Magnan.[1] Many cases have been reported both of mania and melancholia: but so far the symptoms have not been characteristic of any special ætiological influence on the part of the syphilitic virus. Syphilis, however, always produces a profound disorder of nutrition, in many cases a special cachexia; and it seems to be undoubted that in those persons who are at once the victims of syphilis and predisposed to diseases of the nervous system, the combined influence of the special poison and of the malnutrition dependent upon it, is capable of arousing various forms of mental disorder, such as typical attacks of mania, and sometimes of melancholia; but it has not been clearly demonstrated that these attacks have any special or characteristic relationship to syphilis. The action of syphilis in its later stages upon the connective tissue of the brain and spinal cord, and in the formation of arterial sclerosis, and of neoplasms in the nerve centres, is one of its principal methods of causing mental disorder. The most important forms of syphilitic affection of the brain or its membranes are: (1) meningitis of the base of the brain; (2) meningitis of the convexity of the brain: (3) arteritis; (4) gummata. These conditions will be referred to later on: they are all accompanied by insanity, varying from acute maniacal attacks or acute melancholia up to complete dementia, with hemiplegia and paralysis.

Another very important influence of syphilis upon the nervous system is its causative relationship to general paralysis of the insane. It has not by any means been proved that syphilis is a necessary antecedent of this disease; but statistics and arguments of a convincing kind are gradually increasing in number, which confirm the opinion that in the large majority of cases, syphilis, acquired or hereditary, has preceded, at a longer or shorter interval, the appearance of the symptoms of general paralysis. On the other hand, it is not asserted by

[1] Magnan, *Leçons cliniques sur les Mal. ment.* (1897), p. 4.

the supporters of the syphilitic theory that general paralysis is a syphilitic disease, nor is it denied that it may arise independently of syphilis. It is, however, firmly believed that in by far the greater number of cases an antecedent syphilitic affection is the chief predisposing cause. That a toxin exists in the blood in general paralysis has been shown by examination of the urine, but its presence is rendered indistinguishable by the pathological changes discoverable in the renal epithelium after death. These changes consist of necrosis of the lining epithelium of the glomeruli and tubules, especially that of the convoluted tubules, and the extravasation of blood, lymph, and leucocytes into their lumen. Such changes as these are never met with except in toxic forms of nephritis. In about 70 per cent of cases of general paralysis there is found fatty degeneration of muscle (especially of the heart muscle), more marked than is met with in diphtheritic paralysis. There is also cartilaginous degeneration and a change in the nutrition of bones. These tissue changes can only be explained on the supposition of a toxæmic condition of the blood, which is probably due to a parasyphilitic toxin, or to the products of the disintegration of nervous tissue. Dr. Mott and Professor Haliburton have discovered cholin in the cerebro-spinal fluid of general paralytics. Cholin is one of the products of the disintegration of protagon, and it is known to have a degenerative action on muscular tissue. The degeneration of nerve tissue in general paralysis may therefore be due either to a previous toxicity of the blood during the syphilitic infection, lowering the vitality of the nerve tissue, and rendering it more liable to break down in the presence of adverse influences, or to the syphilitic poison continuing to exercise its baneful effect upon the nervous structure. The two factors which render the syphilitic virus especially dangerous to the nervous system are, the absence of any explicit treatment in the early stages of the disease, and alcoholism. The failure of any syphilitic remedies to arrest the course of undoubtedly syphilitic general paralysis or tabes dorsalis, is, according to Fournier,[1] evidence of the fact that it is not the syphilitic poison itself which has to be contended with, but a

[1] Fournier, *loc. cit.*

parasyphilitic poison, the result of some remote nutritional or tissue change, initiated by syphilis.

The fact that phthisis is a slow disease, exercising a denutritive influence by means of the hæmorrhages, general emaciation, and exhaustion it produces, as well as by the occasional accumulation of purulent matter in the lung cavity, makes the action of the toxin of the special bacillus somewhat complex and obscure. Tuberculosis occurs very commonly among the insane and the neurotic. The tubercular diathesis is an hereditarily transmissible one, and is, as we have seen, hereditarily transmutable with insanity and the neuroses generally. All these facts make it almost impossible to assign with any certainty a causative influence to the tubercular toxin towards the insanity with which it is so commonly associated. There are certain facts, however, which seem to point to a certain amount of connection between tubercular infection and mental symptoms commonly met with in phthisical cases. There is, for example, the "euphoria" or hopefulness of the patient during the later stages of the disease, and there is also the characteristic appearance of groundless suspicion, especially in the more chronic forms of phthisis. Notwithstanding the fact that the late Prof. Ball of Paris and Drs. Maudsley and Clouston of this country have strongly supported the idea of a phthisical form of insanity, there appears to be no sufficient ground for burdening modern classification with an additional variety for which there is neither necessity nor clear foundation; for all the symptoms which these writers have claimed as being characteristic of phthisical insanity can be equally well accounted for by the neurasthenia which arises from malnutrition and physical weakness.

C. Voluntary Intoxication

Alcohol.—That alcohol can induce profound mental disturbance is unfortunately too commonly observed a fact to require any confirmation. That it strongly predisposes to insanity by the establishment of serious hereditary degeneration has been already shown (see p. 9). By interfering with

the course of physiological nerve action, by lowering the resistance of the nervous system, by disturbing the nutrition of the nerve elements through an interference with their vascular supply and with metabolism generally, as well as by a direct toxic influence on the nerve elements themselves, alcohol probably becomes the potent cause of a variety of mental affections in the individual.

In estimating the influence of alcohol as a cause of the ordinary insanities in an individual life, as distinguished from the purely alcoholic nervous affections, much care must be taken in the interests of scientific truth. No good can result from the wilful over-estimation of an evil, and much harm does occur from the loose handling of unverified statistics. It is owing to the absence of reliable statistics on this important point that we find ourselves at this present time unable to express even an approximate opinion as to the percentage of ordinary insanity in this country caused directly by over-indulgence in alcohol. Different authorities give widely differing figures which vary from 5 per cent up to 40 per cent, and which, while allowing for variations in localities and circumstances, we are compelled to reject on account of their unauthenticated character and their extraordinary disparity.

The following points must always be kept in mind in forming a clinical judgment upon the alcoholic origin of any individual case of non-alcoholic insanity.

(1) *The Factor of Personal Resistance.*—It is well known that the degenerate as a class are extremely sensitive to the action of alcohol, towards the use of which they manifest a strong proclivity, with the result that they readily develop any of the various forms of alcoholic insanity or of the general insanities which may owe their origin to alcohol. "Pour devenir alcoolique il faut être alcoolisable," says Féré;[1] and the truth of that aphorism may be proved by very ordinary observation. We know that some men can drink steadily for years without apparent bad results; others can do the same with apparent immunity so far as the nervous system is directly concerned, but at the expense of disease of other

[1] Féré, "Notes sur les alcoolisables," *Soc. Méd. des Hôpitaux* (1885), p. 293.

bodily organs. Under similar circumstances a third group of more neurotic individuals become subject to the periodic occurrence of acute alcoholism or end by developing the symptoms of chronic alcoholism, but without any manifestation of technical insanity.

(2) *Discrimination between Cause and Effect.*—It is generally admitted that a strong inclination to the abuse of alcohol is often an early symptom, and not always a cause of insanity. It must be admitted that the discrimination between cause and effect is here a matter of extreme difficulty, and in the present state of our knowledge is often impossible. Diminished self-control and moral obtuseness are perhaps the earliest signs of approaching mental breakdown, and may in themselves form the whole insanity, while they often immediately precede graver psychoses.

(3) *The Co-existence of other Causes.*—Hereditary predisposition to insanity is generally present in those cases in which attacks of mental disturbance are precipitated by the use or abuse of alcohol. This tendency, of course, varies extensively and intensively in different persons; but must always be taken into account. So must other numerous adverse circumstances in the individual's history and environment which conduce to the alcohol habit, at the same time as they directly expose him to insanity. Among these are diseases of all kinds, poverty, bad hygienic conditions, the absence of healthy mental ideals, mental worry, prolonged anxiety, and great political, family, and personal crises.

With regard to the *modus operandi* of alcohol in the causation of insanity, considerable information has been obtained from the psycho-physiological experiments of Smith and of Kraepelin.[1] These observers have shown that the result of an average dose of alcohol, apart from the temporary effect, was not fully apparent until the evening of the second day following the experiment. It then manifested itself by a sensible lowering of the mental capacity for work, an increased motor excitability, and a tendency towards automatic as opposed to voluntary cerebral action. The taking of a daily quantity of alcohol corresponding to 2 litres of beer

[1] Kraepelin, *Lehrbuch der Psych.* p. 40.

began from the second day to produce the same effect upon the functionating of the higher nerve centres. At the end of the twelfth day the alcohol was stopped, and a single dose again administered seven days thereafter was followed by all the former symptoms in an exaggerated form. Further, Kraepelin has shown that the mental reflex action as manifested in test calculations and otherwise, was effectively diminished by daily moderate quantities of alcohol. From these and other experiments Kraepelin infers that the psychical condition of those people who take alcohol daily must differ considerably from that of those who only take it occasionally or not at all.

Histological examination of the nervous system of persons addicted to excessive alcohol drinking, and of that of animals experimentally subjected to it, has revealed degenerative changes of the gravest character in the cells, finer fibres, neuroglia, and blood-vessels of the cerebral cortex. These researches have revealed the fact that the nervous system is more liable than any other tissue of the body to be pathologically affected by the alcoholic poison.

Morphia, Cocaine, Chloral, etc., are each of them capable of producing insanity, but their influence in that respect is infinitely inferior to that of alcohol, both because they are much less frequently and less widely used, and because they are less directly destructive of nervous tissue. These drugs are habitually employed only, as a rule, by a certain class of degenerates in whom their constant use constitutes a special neurosis by itself. It is rare to find the victims develop ordinary insanity, although they are peculiarly liable to moral and intellectual degradation, often quite as profound as is met with in many of the psychoses. They are also liable to ill-formed and irregularly systematised delusions of suspicion with hallucinations, which renders them a danger and a pest to society.

Certain forms of mental aberration, accompanied by other nervous symptoms, have been observed among workers in lead and mercury. Saturnism or lead poisoning has been proved to be the cause of maniacal excitement and hallucinations closely resembling alcoholism, which may end rapidly in dementia.

It has also been shown that it is the cause of a form of general paralysis, which Régis[1] classes among the pseudo-general paralyses. Charcot described a form of sensory disturbance caused by the fumes of mercury, which resembles hysteria, and other observers have recorded cases of confusion with excitement and hallucinations, and of symptoms simulating general paralysis, due to mercurial poisoning.

[1] Régis, *Annales Méd. Psych.* (1880), p. 174.

PART II

PHYSIOLOGICAL AND PATHOLOGICAL

CHAPTER V

ON SOME PHYSIOLOGICAL AND HISTOLOGICAL ASPECTS OF THE NERVOUS SYSTEM

In the grey matter of the cortex we find the physical substratum of those obscure psychical processes which we recognise as Conscious Mind. This grey matter, which in its position and lamination is *sui generis*, covers the whole convoluted surface of the cerebrum. Into it medullated nerve fibres pass from the white matter of the brain, which run together in bundles and separate the nerve cells into longitudinal columnar groups. The nerve cells of the grey matter of the cortex vary in form and arrangement in its successive layers, whereby various layers are distinguished. But in different parts of the cortex the arrangement of the cells into layers, and to a certain extent also the form of the cells themselves, vary, so that there are several "types" of cortical lamination.

The most common type of lamination in the human brain is the "motor" type, which has five layers, of which the following is a short description. For more detailed descriptions of the lamination of the cortex the reader is referred to Bevan Lewis.[1]

(1) *Superficial or Molecular Layer.*—This layer, which lies peripherally under the pia, forms about one-tenth of the whole thickness of the cortex; contains a few medullated nerve fibres which run longitudinally underneath the pia; and also non-medullated fibres derived from the peripherally directed processes of the deeper pyramidal cells which ramify in its

[1] Bevan Lewis, *Text-Book of Mental Diseases*, p. 85.

substance. Neuroglia cells abound in this layer. They are mostly elongated at right angles to the pial surface, to which most of them are attached by a strong process.

The nerve cells of this layer are small and few in number. They vary in size, shape, and in the number of their processes. Many are fusiform, and lie parallel to the surface; others are rounded or root-like, and elongated at right angles to the surface. Some of these cells have more than one axis cylinder process, and some of these may arise from the dendrites.

(2) *Small Pyramidal Layer.*—This layer is nearly of the same thickness as the preceding. It contains a large number of small angular or pyramidal nerve cells, with a proportionally large nucleus. The protoplasm processes of these cells extend into the superficial layer, and their axis cylinder processes either pass down into the white matter, or end in arborisations among the cells of the next layer.

(3) *Layer of Large Pyramids.*—This layer is of much greater thickness than the others mentioned. It contains pyramidal branching cells of various sizes, the pointed extremities of which extend in the direction of the surface of the convolutions. In the deeper portions of the layer the cells are larger. The axis cylinders are continued into the white substance and give off numerous medullated collaterals which ramify soon after their origin.

(4) *Layer of Polymorphous Cells.*—This layer, which contains many small irregularly shaped cells with numerous protoplasmic processes, is narrower than the preceding layer. Most of the axis cylinders of these cells pass into the white matter, but some of them appear to ascend as far as the molecular layer.

(5) *Layer of Fusiform Cells.*—This is also a mixed layer, most of its cells being, however, of the spindle type, placed for the most part vertically; but at the bottom of the sulci they lie horizontally and in the line of the arcuate fibres, passing from one convolution to another. These fusiform cells are most abundant in the Sylvian fissure cortex and the claustrum.

The "sensory" type of cortex is distinguished from the

"motor" by the absence of the very large pyramidal group of cells (cell nests) which are so common in the central convolutions, as well as by the interposition of a "granule" layer, consisting of very small angular cells which, when they intersect the layer of large pyramids, give rise to a seven-laminated cortex, as in the cortex of the calcarine fissure. When it is interposed, as in the temporal lobe, between the third and fifth layers, the cortex is six-laminated. The cortical areas intervening between the motor and sensory regions show what Bevan Lewis terms a "transition" type between the two.

The cortex of the hippocampus major, of the gyrus hippocampi, and of the olfactory lobe, presents peculiarities of arrangement, for an exposition of which the student is referred to Van Gehuchten,[1] to Bevan Lewis,[2] or to Quain.[3]

The neuroglia elements consist of highly branched cells, which vary greatly in size and in the number and arrangement of their processes. Their nuclei are oval or rounded in form, and possess a prominent nuclear membrane and chromatic filaments distributed evenly throughout the nuclear matrix. There is a tendency on the part of the cell protoplasm, originally large in amount, to become smaller, and in the older cells to enter more into the formation of the fibres. The fibres, it appears, do not end in the cell body, but pass through it and are continued beyond it. Weigert maintains that the fibres have no anatomical connection in the adult with the cell body; but this is emphatically denied by Dr. W. Ford Robertson.[4] As the fibres pass out from the cell, two or more of them frequently join to form a single fibre, which again divides into two fibres almost immediately beyond the point of junction. At a greater distance from the cell body the fibres seldom branch, and never anastomose. A very large proportion of these fibres end in the adventitia of the blood-vessels; some of them appear to end free; whether or not any of them are attached to the nervous elements has not yet been ascertained.

The neuroglia cells are most abundant in the white matter

[1] Van Gehuchten, *Anat. du système nerveux*, 1893.
[2] Bevan Lewis, *loc. cit.* [3] Quain's *Anatomy*, 1893.
[4] W. F. Robertson, *Edin. Hosp. Reports* (1897), p. 241.

of the brain, in the first layer of the cortex below the pia, underneath the epithelium of the ventricles, and around the larger blood-vessels. Ford Robertson believes that the differenee in the size of the neuroglia eells is related to the faets that they have only a limited existenee, and that there is strong evidence that they are constantly proliferating, at any rate in eertain of the lower animals.

Several theories have been propounded as to the functions of these cells. Of these, only two appear to hold the field at present—the "mechanical support" theory, which attributes to the neuroglia a function analogous to eonnective tissue, and the theory that it forms the tissue of repair in the brain, whieh places it on a level with the white, fibrous tissue in other parts of the body. Both these theories appear to me to be wholly inadequate, in view of the highly differentiated strueture of these eells and the eomplicated arrangement of their fibre eonnections. Their developmental origin from the epiblast in common with the nerve elements, their highly differentiated and prominent position, and their more or less definite arrangement in the nervous eentres, point strongly to the probability of their nervous function. What that funetion may be, we can only guess, but it is not unlikely that it is eonneeted with the vaso-motor control of the blood-vessels, to which they everywhere stand in elose and intimate anatomical eonneetion. Apáthy [1] considers glia cells to be nerve eells without primitive fibre.

The blood-vessels of the cortex enter the subaraehnoid spaee, and there divide and subdivide into branches whieh are supported by the pia-mater. These small arteries are more deeply situated in the various fissures and sulci than the veins, which do not aeeompany the arteries, but pursue a eourse upon the surface of the pia. The arteries in the pia form a elose plexus whieh at once sends numerous fine braneheS into the grey matter. Larger braneheS (medullary arteries) pass from the pia through the grey matter, giving off some small braneheS to it in their course to the eentre of the white matter. The smaller pial arteries to the grey matter do not anastomose with one another.

[1] Apáthy, *Mitteilungen zool. Stat. zu Neapel*, 1897.

In the frontal lobe the following is the scheme of the cortical blood-supply. The superior frontal, the anterior two-thirds of the middle frontal, and the upper extremity of the ascending frontal are supplied by the anterior cerebral. The inferior, the posterior extremity of the middle, and the greater part of the ascending frontal convolutions are supplied by the middle cerebral. The orbital surface is supplied outside the orbital sulcus by the middle cerebral, within that sulcus by the anterior cerebral. All the convolutions of the parietal lobe are supplied by the middle cerebral artery. The occipital lobe is supplied entirely by the posterior cerebral.

In the temporal lobe the superior and upper parts of the middle convolutions are supplied by the middle cerebral artery, the lower portion of the lobe by the posterior cerebral.

On the inner surface of the hemispheres the whole anterior and upper portion as far back as the parieto-occipital fissure is supplied by the anterior cerebral, the cuneus and the occipito-temporal region by the posterior cerebral artery.

Until quite recently the presence of nerves upon the cortical blood-vessels had not been discovered or believed to exist. Early in 1897 Obersteiner[1] of Vienna found nerves on a pial vessel in an old preparation stained by a gold method. During last year Drs. Gulland[2] and Ford Robertson of Edinburgh and Dr. A. Morrison[3] of London demonstrated their presence. The cerebral vessels are therefore, as might have been supposed, not exceptional in their method of vaso-motor control.

The Neuron

The nerve cell may be regarded as the basis of all neurological study, and a knowledge of its structure, in view of the effects of its pathological change upon the harmonious function of the nervous system, is of the highest importance.

The nerve cell with its appendages is called a Neuron. Each neuron is a distinct, separate, and independent organic unit, composed of a cell body containing a nucleus and nucleo-

[1] Obersteiner, *Neurol. Centralblatt.* (1897), p. 356.
[2] Gulland, *Brit. Med. Journ.* (Sept. 17, 1898), p. 781.
[3] A. Morrison, *Edin. Med. Journ.* Nov. 1898.

lus, and of several processes. These processes are of two kinds—namely, the axis cylinder process and the protoplasmic process or dendron. The axis cylinder process, of which there is generally only one for each cell, is a fine, white filament of uniform calibre, extending for the most part long distances without giving off collaterals, and being enclosed in a myelin sheath at a point very close to its cell of origin. The protoplasmic processes, on the other hand, are numerous; their contour is irregular and granular; they begin to give off usually a great number of collaterals immediately after leaving the cell, and consequently they rapidly attenuate more and more until finally they become lost in the surrounding intricacy of fibres.

To the foregoing description the short axis cylinder cells of Golgi form an exception by giving off an axis cylinder process which is not surrounded by myelin, and which divides into numerous branches immediately after leaving the cell; other cells, again, sensory in their character, have only a single protoplasmic process of large size, which is covered with a myelin sheath.

We learn from the researches of Ramon y Cajal, Kolliker, Van Gehuchten, and others, that the protoplasmic processes are *centripetal;* that they conduct to the body of the neuron the nervous impressions which they have received at the level of their ramifications; and that the axis cylinder process is *centrifugal*, conducting impulses from the cell, and by means of its collaterals and terminals transmitting them to the various elements with which it comes into relation.

The researches of Nissl [1] have quite recently added greatly to our knowledge, and his methods of staining have in the hands of others been productive of much additional information. According to this method the cell body is found to consist of two kinds of substance—one which stains darkly with methylene blue, and one which does not. The former is termed the chromatic, and the latter the achromatic substance. The chromatic substance exists in the cell body in the form of granules, cones, rods, or caps, which are generally termed chromatophile elements or Nissl's corpuscles.

[1] Nissl, *Neurolog. Centralblatt.* (1894), Nos. 3 and 4.

These forms vary in structure and arrangement in different cells, and their arrangement (striated, concentric, or reticular) gives, according to Nissl, a definite morphological stamp to the various cells. He believes that a striated arrangement of these bodies is characteristic of motor cells, and that a reticular concentric arrangement is probably most frequently found in ganglion cells. The achromatic substance within the cell body presents the appearance of a fibrillary network, which also varies considerably in arrangement in different kinds of cell. According to Nissl,[1] Marinesco,[1] and Flemming,[1] these reticulated fibrils are the continuation of the fibrils of the axis cylinder process, and are continued into the protoplasmic processes or dendrons. The chromatophile elements lie within the interstices of the intracellular network. They appear to be attached to its trabeculæ, especially at the points of crossing. The chromatic substance follows in its arrangement that of the achromatic fibrils; sometimes it is diffuse and granular, at other times it appears as streaks of irregular length and course, or as rods or cones. In other cases the chromatic substance impregnates the trabeculæ, forming comparatively large stellate patches, which gradually fade towards their circumference into the surrounding achromatic substance. When the reticular meshes are very fine, the encrustations of the chromatic substance may almost wholly occlude the achromatic fibres.

Held[2] and Bitschli assert that no distinct nerve fibres are apparent in the axis cylinder as it approaches the cell, and that the only appearance is one of a network with longitudinally directed meshes. Further, Held states that this network is a *post-mortem*, artificial appearance, the result of vacuolation of the protoplasm by chemicals used in fixing. The cause of the appearance of the longitudinal striation of the protoplasm of the axis cylinder cell body and dendrites is the presence in large quantity of intensely stained granules, which he terms "neurosomes," and which are found in the trabeculæ of the longitudinal meshes and between the same. These neurosomes are more sensitive to certain stains than

[1] Quoted by Goldscheider and Flatau, *Anatomie der Nervenzellen*, 1898.

[2] Held, *Arch. für Anat. und Physiol.* 1897.

other parts of the nervous tissue in question, and are far more closely aggregated in the axis cylinder, and especially in its terminal branches, than they are in the protoplasm of the cell body or of the dendrites of a neuron. By means of their presence, therefore, it is easy to distinguish with accuracy the axone from the other processes of atypical cells, such as those of the olfactory nucleus and of the molecular layer of the cerebellar cortex.

In the centre of the cell is the nucleus, but its central position is not always uniform. More important is its size, which varies greatly in different cells. Thus, in the small pyramidal cells of the cerebral cortex, the nucleus is comparatively large, and well surrounded by the cell protoplasm (somatochrome cells). In the cerebellar cortex, on the other hand, Purkinje's cells have a relatively small nucleus. In somatochrome cells Van Gehuchten finds a nucleus of uniform size, surrounded by a membrane which separates it from the surrounding protoplasm, and in its centre lies a deeply stained nucleolus.

Motor Cells. — As has already been mentioned, Nissl believes that a parallel striated arrangement of the chromatophile elements is indicative of motor function. The parallel arrangement, which is marked by the arrangement of the chromatophile elements and the neurosomes, is best seen at the periphery of the cell, where the chromatophile bodies are more elongated, and in the direction of the dendrites. Within the dendrites also they are elongated in the long axis of the process. That part of the axis cylinder which is within the cell is distinguished by the absence of chromatophile elements. At its periphery and on the side entered by the axis cylinder is a crescentic elevation, the convexity being towards the nucleus which marks the junction of the axone to the cell body. This ganglionic space is distinguished by its homogeneous clear appearance from the surrounding granular substance. The nuclear membrane of motor cells is clear and bright; the nucleus itself is large, and contains usually one, but sometimes two large nucleoli.

Ganglion Cells.—In man these cells approach the globular in shape, but are usually elongated in one direction. The

ganglion cells in the posterior horn of the spinal cord are surrounded by a connective tissue capsule, which is continued as Henli's endoneurothelial sheath of the axis cylinder. From this capsule bands of a loose connective tissue enter the ganglion as septa, which are continued into the nuclear membrane. With few exceptions these cells are unipolar, and soon after leaving the cell the process divides in a T-shaped manner into two branches, one of which, the central, enters into the posterior column; the other, the peripheral, passes out by the posterior root of the cord. The axone is inserted into the cell body by a broad conical thickening, which is otherwise similar to the origin of the motor axone. In most respects the cell body resembles that of motor cells, with the exception of the arrangement of the chromatophile elements. These bodies are more granular, and tend to arrange themselves concentrically, chiefly in two circles. They form an irregular layer round the sphere of the nucleus, and Von Lenhossek [1] has described another layer which forms a garland round the cell not far from its periphery. The achromatic substance corresponds in all respects to what has been said regarding motor cells. The nucleus is round or slightly elliptical, and stands out bright against the cell body; a nuclear membrane is distinctly visible; and the large size of the nucleolus is remarkable.

The presence of a certain amount of yellow pigment in nerve cells appears to be normal. It is certainly more abundant in man than in any other mammal, and in the former it tends to increase with age. It lies in clusters, chiefly at the point of emergence of the processes, and may extend from there to the nucleus.

The physiological *rôle* of the cell body of the neuron is at once that of a receiver and of a transmitter. It receives impressions through its protoplasmic processes and transmits them through its axis cylinder to some other neuron. This is what Ramon y Cajal and Van Gehuchten term the "dynamic polarisation" of nerve elements.

It is probable that impressions are conducted through the cell by means of the achromatic fibrillary network, and that the

[1] Von Lenhossek, *Arch. für Psych.* 1897.

function of the chromatophile elements is one of nutrition and vital storage. The fact that these bodies have been shown to consist of a nucleo-proteid [1] confirms this view, as does also the observation that after prolonged stimulation of the cell there occurs a notable diminution in the size and volume of the chromatophile blocks. The cell body is then a centre of transmission for nervous influences, which it does not create, but simply directs, perhaps transforms. But the function of the cell body extends also to the exercise of a trophic influence upon all the processes which spring from it.

The solidarity of the different parts of the neuron is so intimate that lesion of one of its parts reacts injuriously sooner or later upon the whole neuron. In disease or injury of the cell body all the processes rapidly degenerate, and when any of the processes are affected the cell body soon suffers. In section, for instance, of the cylinder axis of one of the cells in the anterior horn of the spinal cord, considerable changes take place in the motor cell, in which, however, the damage is not so profound as in the process which has become separated from it.

We see, then, that the entire nervous system is composed of a collection of neurons, the processes of which intermingle and interlace as do the branches and roots of forest trees. So great is the intricacy that in the adult, at any rate, it is impossible to disentangle and distinguish them. To Cajal is due the credit of having pointed out that throughout this interlacement of fibrils no anastomosis of the various cell processes takes place; that the terminals are free; and that the connection is one of contiguity, not of continuity between the processes of different cells. It is, however, only right to remember that years previously Waldeyer had propounded his theory of the neuron, and that Golgi's silver stain had prepared us for the knowledge which a little later Cajal had confirmed. From their writings we learn to regard the neurons of the nervous system as constituting a chain of connections from the centre to the periphery, and *vice versa*, and also in lateral (associative) directions. We regard, then, the arrangement in the following simple way. The axone of each neuron comes into contact relation with the protoplasmic

[1] Macallum, *Brit. Med. Journ.* Sept. 17, 1898.

processes of a neighbouring neuron: the axis cylinder process of this second neuron comes into contact with the dendrites of a third neuron, and so on indefinitely. Again, in the centrifugal motor path we discern a chain of neurons commencing in the cortex passing through the anterior horn of the spinal cord and ending in muscle fibre; and in the centripetal sensory path a chain commencing with an end organ, say, in the skin, passing through the posterior root zone and ending in the cortex. But these two systems are more intimately connected than has been shown, for the neurons of the centrifugal motor path are by means of their protoplasmic processes connected at each point of cell interruption with the axis cylinder of a neuron of the sensory path. In this way the nerve impulses travelling in either direction are partially reflected, and at each level there is a mechanism for independent reflex action. From this also we see that no nerve cell creates force, but is merely the transmitter and transmutator of stimuli carried to it from outside or from inside the body itself. Probably it also augments forces in transmission.

This forms the basis of the modern "theory of the neuron," upon which has been reared many ingenious and plausible theories. If the neurons are entirely independent of one another, if they only touch and never anastomose; above all, if they have a limited power of motion, as Lepine[1] declares them to have, then a vast field of speculation opens up before us, and a working theory of the greatest value is ready to our hand to account for such phenomena as hysterical paralysis, functional aphasia, hallucination, sleep, and even insanity.

Unfortunately we were scarcely in view of such a possibility when the whole neuron theory received a serious check from the recent researches of Held and of Apáthy. Held, while agreeing that in embryonic tissues and in early youth the neurons are entirely independent of one another, states that when the terminals of an axone come into contact with the cell body of another neuron they are fused together; indeed, he holds that there is evidence that the terminals of the axone plunge deeply into the cell protoplasm of the second neuron, and that they come into close proximity with its

[1] Lepine, "Théorie du Sommeil," *Rev. de Méd.* 1894.

nucleus. He can, however, always distinguish these terminal axones even in fusion with the cell body. It would seem, however, that Held is still an adherent to the "neuron" doctrine.[1]

The researches of Apáthy[2] are more important. He divides nerve cells into two kinds, nerve cells proper and ganglion cells. From the nerve cell proceed neuro-fibrils. These neuro-fibrils arise from the processes of the nerve cell, and pass through a number of ganglion cells, ultimately leaving the last ganglion cell to enter a muscle fibre or a sensory cell. The neuro-fibril, therefore, is a continuous, uninterrupted structure throughout its whole course. In passing through a ganglion cell it enters by the axis cylinder process, coils round and round in the interior of the cell, and then leaves by the axone process through which it entered the cell. Inside the ganglion cell a reticulum of fine fibrils derived from the neuro-fibril in transit can be easily perceived by his chloride of gold method. The ganglion cell, therefore, supplies the force which is to be conducted along the neuro-fibril.

The above observations have been made in invertebrate animals, principally the leech, in which the cells are unipolar. In other animals, however, in which the cells possess dendrites entirely separate from the axone, the neuro-fibrils enter the cell by way of the dendrites, ramify and anastomose freely inside the cell body, and then reuniting, take their exit by way of the axone. Each neuro-fibril is made up of a large number of elementary fibrils, and, as during its course these are being constantly given off, the neuro-fibril may ultimately become reduced to a single fibril. Thus, one nerve cell may, by means of one or more elementary fibrils, be put into connection with several ganglion cells, and *vice versa;* but while one ganglion cell may be put into connection with several nerve cells, an end-organ cell is never connected directly with more than one nerve cell.

In the face of these revelations of Apáthy it must be admitted that the neuron theory, as latterly conceived, must be at least considerably modified.

[1] Barker, *Amer. Journ. of Insanity*, vol. lv. p. 43.

[2] Apáthy, *Mitteilungen aus der zoolog. Station zu Neapel*, Band xii. (1897), 501-748.

Cortical Localisation

The Sensory and Motor Paths of the Cortex.—The recent researches of Flechsig have considerably increased our knowledge of the exact course of the sensory fibres and of their ending in the cerebral cortex. The general bodily sensory fibres, which convey impressions of touch and pain, of thermal, muscular, and organic sensations, enter the ganglion cells in the posterior horns of the spinal cord, and ascend through the posterior columns of the cord on their way towards the brain. In the adult these fibres are, except in cases of secondary degeneration, practically inextricable in their course from the surrounding complex of medullated fibres. In the fœtus, however, the various bundles take on the medullary sheaths at different stages of evolution, and by studying the course of the medullary development of the various fibre bundles, Flechsig [1] has been able to trace the course of the various sensory tracts. From his description we learn that the first of all the sensory paths to be developed is the projection sensory system of the posterior root columns, which includes the sensory nerves of the skin, touch, temperature, muscular sense, and organic sensations. The majority of these fibres are found to enter the lateral nuclei of the optic thalamus from the posterior third of the internal capsule. Flechsig divides the tract into three systems according to the time of their development.

The first takes on the medullary sheath about the commencement of the ninth month of fœtal life, and occupies a definite area in the internal capsule immediately behind the pyramidal tract. From thence its fibres proceed towards their termination, which is exclusively the cortex of the central (Rolandic) convolutions.

The second acquires medullary sheaths about a month later than the first. It also proceeds from out of the lateral nuclei of the optic thalamus, but from a point more dorsal than the latter. A part of the fibres of this system reaches the cortex of the paracentral lobule and the foot of the first frontal convolution; another part extends in relation along the whole of

[1] Flechsig, *Die Localisation der geistigen Vorgänge*, 1896.

the inner side of the gyrus fornicatus; a third part enters the cingulum and terminates in the cornu ammonis; while a fourth part, of somewhat later development, enters the cuniform convolution, and extends forwards and underneath to terminate in the subiculum cornu ammonis. The whole limbic lobe is thus seen to be connected with fibres from the lateral nuclei of the optic thalami.

The third system of medullated fibres, also from the lateral nuclei of the thalamus, emerges from about the middle part of the internal capsule. A part of it proceeds directly to the foot of the third frontal convolution; other portions, after describing several sharp curves, ultimately distribute themselves to the third frontal convolution, the central part of the gyrus fornicatus, the anterior half of the first frontal convolution, and to the foot of the second frontal convolution.

If we now turn to the results of physiological and pathological investigation, we find that the destruction of the Rolandic area is accompanied by loss of kinæsthetic perception, so that ideation of place and motion for the extremities and face regions becomes impaired. Among the skin sensations it is only the finer perception of touch and its localisations in limited areas which suffer. For example, in injuries to the hand area in the cortex, there is an inability, varying with the extent of the injury, to discern the form of external objects through the sense of touch. In injury of the third frontal convolution it is believed that there occurs an incapacity to represent in consciousness the situation of the organs concerned in speech. System 3, which ends in the third and perhaps also in the first frontal convolution, is not concerned in the perception of qualitative sensations, but in the representation of secondary sensations from the central convolutions. The limbic zone, which is supplied by System 2, undoubtedly subserves the function of muscular sense, and this has been specially proved in the case of the gyrus hippocampi. The experiments of Ferrier, Horsley, and Schäffer have shown that destruction of the gyri fornicati and hippocampi in animals is followed by persistent anæsthesia of tactile and pain sensations.

We must, therefore, conclude that the sphere of bodily sensation supplied by the posterior roots is widely spread out, embracing and overlapping the whole motor area of the cortex, externally and internally extending from the vertex to the corpus callosum and including the limbic lobe.

The sphere of the cortex above described as concerned in general bodily sensation no doubt contains numerous different kinds of sensory centres, among which the centre for touch is of special importance; yet touch cannot be located in any special centre, for the sense of touch presupposes the co-existence of various other sensory qualities. The sphere of bodily sensibility is also the recipient of the vital organic sensations, such as those of the whole respiratory and circulatory organs, and is consequently concerned in the perceptions of the body temperature, the vaso-motor variations, and other organic sensations. As the centre, therefore, of the conscious perceptions of the whole sensory and organic functions of the body and of its voluntary motor innervation, it occupies by far the highest and most important office among the cerebral centres in constructing the affective bodily states, in forming the conception of the "Ego," and in regulating the emotions.

The olfactory centre occupies a position of the cortex embracing the whole posterior border of the base of the frontal lobe, and a part of the neighbouring inner border of the temporal lobe. This region bridges over the island of Reil. From each of the aforesaid portions of the olfactory centre fibres proceed to the cornu ammonis, which is thus in intimate relation with olfactory sensation. Fibres also proceed from the frontal and temporal olfactory regions to the globus pallidus of the lenticular nucleus and to the thalamus, which probably represent cortico-fugal reflex paths.

The position of the cortical centre of taste has not as yet been located.

The fibres of the optic tract, which do not develop fully until the middle of the tenth month of infant life, are found to proceed directly to the external corpus geniculatum, and thence to the anterior corpora quadrigemina. The extension of these fibres from the latter bodies to the optic thalamus

has not been established by Flechsig, but a large bundle from the corpus geniculatum goes to the pulvinar of the thalamus, and from thence proceeds to the cortex of the calcarine fissure. This bundle of fibres forms, however, only a portion of the apparent optic tract; but it is the one that degenerates in lesions of the part of the cortex immediately around the calcarine fissure. The majority of the remaining fibres of the tract are probably cortico-fugal, and originate in the cuneus and lingual lobule (fifth temporal convolution) as far as the basal surface of the occipito-temporal lobes. The "visual sphere" of Flechsig, therefore, embraces the whole mesial surface of the occipital lobes and a very narrow strip of the superior margin of the lobes, but not including the external occipital convolutions or the angular gyrus. The angular gyrus has, it seems, no connection with sight, and its erroneous inclusion by some observers is due to the fact that fibres from the visual centre proper pass underneath its cortex on their course to the thalamus, and thus are liable to injury in lesions of the gyrus.

The cochlear nerve, which is the last of the special sensory nerves to become developed, enters into intimate relation with the posterior corpora quadrigemina and also with the corpus geniculatum, and ends in the third and fourth fifths (reckoning from before backwards) of the cortex of the first temporal convolution and in the transverse convolutions of the temporal lobe. The latter convolutions lie hidden in the Sylvian fissure, and the anterior especially is in close connection with the posterior end of the first temporal convolution. Injury of the above auditory regions causes sensory aphasia (word-deafness), especially if the lesion is left-sided, and injury to both sides is followed by complete deafness.

The remaining portions of the cortex, which subserve neither sensation nor motion, are in man very extensive. They include, in the frontal lobe, the anterior parts of the first and second convolutions and part of the third, and the gyrus rectus, the island of Reil, the first and second parietal, and the second and third temporal convolutions; also the inner surface of the temporal lobe, the second and third temporal convolutions, the precuneus and the second and third

occipital convolutions. These regions develop later than the sensory centres. Projection fibres are generally conspicuous by their absence, but numerous association fibres grow into them from near and distant cortical regions. Consequently Flechsig has denominated these regions the "association centres" of the brain. By means of these association centres the different sensory centres are indirectly joined together. The association centres are therefore to be regarded as central organs acted upon by sensations from various sensory regions (including motor sensations), and hence they must constitute centres of ideation.

The great posterior association centre, which extends between the touch, visual and auditory spheres, subserves, as clinical and experimental observations show, no sensory functions; but its destruction by disease is accompanied by defects in mental perception, by mental weakness with incoherence, confusion of thought, weakening of the visual and auditory imagination, and inability to recall to memory perceptions based upon the special senses. More definitely there have been found such symptoms as amnesia, colour-blindness, inability to find words to describe the ideas in consciousness, optic aphasia, etc.

This centre, then, collects and forms ideas of external objects and of word forms and word sounds, and connects one with the other. It deals peculiarly with our positive knowledge derived through the senses, and constitutes, in short, the essential physical basis of the best part of mind.

The cortex of the island of Reil is in connection with the general bodily sensation sphere, especially with that of the speech organs, and partly with the auditory and olfactory spheres.

The prefrontal association centre stands undoubtedly in intimate relation with the sphere of general bodily sensation, and from all parts of the latter, fibres project into it. Memory traces of all bodily sensations, especially of all voluntary acts, can and probably do impress themselves upon it. In destruction of this region positive knowledge does not suffer immediately, but a perversion of purpose, with eventually a complete

loss of interest, both subjective and objective, occurs. As partial lesions of this area are often followed by change of character and disposition, it is believed that the prefrontal lobes exercise the functions of perceiving and representing voluntary actions and of general inhibition.

CHAPTER VI

ON SOME PSYCHOLOGICAL CONSIDERATIONS

The Unconscious Mind.—It was not until well on in the present century that the idea of the unconscious in nature and in human life shaped itself into a definite philosophy under the influence of the writings of Schelling, Schopenhauer, and especially of Von Hartmann. The futility of psychology, notwithstanding the brilliant and valuable discoveries of the many eminent men who have devoted themselves to the elucidation of the phenomena of mind, to account for the majority of common mental reactions, whether physiological or pathological, is largely due to the attempt to explain these in terms of consciousness. The error was committed of making "mind" and "consciousness" synonymous terms. Consequently we find ourselves totally unable to apply to morbid mental phenomena the experimental results of the psychological laboratories, and confusion is rendered more confounded when we read the various attempts to explain the unexplainable in terms of physiology. A writer may discourse eloquently enough on the intensities and qualities of sensations, and upon the laws of Weber, Fechner, and Müller thereupon; but when he goes a step further and endeavours to deal with perception on a similar basis, he is dealing with a subject of which, because there is no possible consciousness, there can therefore be no knowledge, for the *process* of perception itself does not enter consciousness at all—only its finished product. The same is true of almost all forms of consciousness. Consciousness is to us human beings of the very highest importance; but it is a secondary phenomenon, a common, though

not indispensable—in fact, an accidental—accompaniment of mental life. The great majority of our mental actions never enter consciousness at all; yet are they neither unimportant nor wasted.

The time has long gone by when the lower animals were believed to be unconscious automata; but the extent of purposive action among the lowest forms of life is scarcely even yet fully appreciated. In the day when a mechanical materialism dominated the physical sciences it was believed that the absorption of food from the alimentary canal could be accounted for by the laws of diffusion and osmosis. We know now that each epithelial cell lining the canal is itself an organism with the most complex functions. It takes up and selects the particles of food, incorporates them into its own protoplasm, and passes them on into the chyle vessels. In the same way the cells of the various secreting glands carry the process of selection of the fitting materials for their purpose to a degree of perfection which no mechanical theory can possibly explain. Cienkowski's observations on amœba are, in this respect, of the highest interest. The *Vampyrella spirogyrae* is a minute red-tinged cell of very simple formation. Cienkowski states that this minute mass of protoplasm will take but one form of food, a particular variety of *algae* (*spirogyra*). It can be observed to send out pseudopodia and to creep along the confervæ until it meets with a *spirogyra;* then it affixes itself to the cellulose coat enclosing one of the cells of the latter, dissolves the coat at the point of contact, sucks in the contents of the cell, and travels to the next to repeat the proceeding. Another monad (*Colpodella pugnax*) was observed by Cienkowski to feed only on Chlamydomonas, which it punctured. It then absorbed the escaping chlorophyll and departed. These actions on the part of unicellular organisms suggest, to say the least of it, a strong analogy with the psychical powers of higher beings. Engelmann's[1] researches into the habits of *arcella*, another unicellular organism, though of more complex structure than *vampyrella*, are equally interesting. *Arcellae* possess a distinct nucleus and a concave convex shell; in the middle of the concavity is an opening

[1] Engelmann, *Pflüger's Arch. für Physiol.*

through which the pseudopodia project, appearing as clear protuberances at the edge of the shell. If a drop of water containing *arcellae* be placed under the microscope, it often occurs that one of them lies on his back, *i.e.* with the convex side downwards, so that the pseudopodia cannot reach any support. It is then observed that near the edge on one side minute bubbles of gas make their appearance in the protoplasm; this side consequently becomes lighter and floats up so that the animal rests upon the opposite sharp edge, when it is able to grasp the slide and completely turn over. The gas bubbles disappear and the animal crawls away. If a little water containing *arcellae* be placed on the under side of a cover glass, and the latter be placed in a small gas chamber, the animalcules at first sink to the bottom of the water. If they find nothing to lay hold of, large bubbles of gas are developed in the protoplasm, and as they are thus rendered specifically lighter than the water they float to the top. If they reach the surface of the glass in such a position that they cannot attach themselves to it by their pseudopodia, the gas bubbles are diminished on one side or increased on another, until a tilting takes place and the edge of the shell comes in contact with the glass, and they are thus enabled to turn over. When this is accomplished the bubbles again disappear, and the animal can now crawl freely over the glass. If they are again detached, the same process is gone over anew. Whatever attempt is made to place them in an inconvenient position, they are always able by the development of gas bubbles of appropriate size and at the proper spot to right themselves, so that they acquire a position favourable to locomotion; and the attainment of this object is always followed by the disappearance of the bubbles. No mechanical theory can account for these apparently psychical actions on the part of these slenderly organised masses of protoplasm. When we consider that our bodies are composed of elements whose structure and function are as complicated, often infinitely more so, than those of the monads mentioned above, we are compelled to admit the comparatively minor *rôle* which consciousness, as the word is popularly understood, plays in human life.

But the specialisation of function in the higher organisms

demands that the question should be more fully referred to that part where the purely psychical functions preponderate, namely, the nervous system.

First must be considered the action of unconscious mind in the independent function of the spinal cord and ganglia. From the movements of the decapitated frog, which overcomes obstacles in a way that can only be the result of intelligence not located in the cerebrum, and from the volition of invertebrates who have no cerebrum, it follows that brain is not necessary for psychical manifestations involving great intelligence and purpose. Nor can it be argued that the œsophageal ganglia in insects take the place of the brain, for when certain insects are divided in two, both portions continue an independent existence for some time, and are even capable of performing the complex physiological functions which in the united animal were relegated to them respectively. Not only so, but it has been observed that the divided segments of an earwig or an Australian ant turned against one another, and under the unmistakable influence of rage fought till exhaustion or death ensued. Flouren's experiments with hens, and those of Voit with pigeons, in which the cerebrum had been entirely removed, are too well known to all students of physiology to require repetition here. The same experiments on rabbits and guinea-pigs are corroborative. Suffice it to say that the movements of these animals after the operation were complicated, occasionally spontaneous, therefore voluntary and often intelligent. What they apparently lacked was persistent intelligence and volition. We must not forget that the higher in the animal scale one goes the greater is the differentiation of structure and function into specialities: but we must bear in mind at the same time that no function is wholly relegated, and that many functions remain intact, being either independent of a higher will, or slightly subservient to inhibitory actions. Among these may be mentioned the independent influence effected by the sympathetic ganglia upon the beating of the heart, and upon the movements of the stomach, intestines, and muscular coats of the arteries, and the regulative influence of the medulla upon such vital functions of the body as circulation and respiration. We cannot, without a misuse

of language, deny mind or will to those independent nerve centres, and if we ascribe to them mind or will, we have to admit that there exists within us an unconscious mind as compared with our conscious mind. We thus abandon the usual meaning of the word "mind," and we see that the rise into consciousness is merely one of its accidental attributes. On the preceding premises alone a conclusion is, however, scarcely justifiable; we must consider further aspects of the subject.

"There is no better touchstone of a genuine philosophy," says Schelling, "than the phenomena of animal instinct, which must be ranked among the very greatest by every thoughtful human being." Von Hartmann defines instinct as "the conscious willing of the means to an unconsciously willed end." Instinct in animals is not the result of conscious reflection, as a moment's consideration of some of its more remarkable examples will amply prove; nor is it a consequence of bodily organisation, for similar instincts pervade all classes of animals, including man, and dissimilar instincts are found in animals of the same genus. Thus, certain birds are migratory, while others belonging to closely allied species are not so; different kinds of spiders construct different forms of webs, while some spiders do not weave webs at all. Again, the knowledge of the consequence of the instinctive means employed is frequently impossible of discernment by sensuous perception, and in many instances cannot be known to the individual, who yet consciously and intelligently makes use of them. Instinct acts directly, unerringly, unhesitatingly, which is far from being the case in conscious reflection. The motives which cause instinctive action are not always pleasurable. Often they imply pain, self-sacrifice, and the death of the individual. The only explanation is, therefore, that instinct is a manifestation of the unconscious mind, which everywhere pervades animate nature, and which, for the preservation of the species, impels to certain actions. The performance of these actions is attended in the individual by conscious, intelligent action, with or without a knowledge of the end in view. Now, this unconscious mind does not act from the outside by implanting a certain mechanism or machine in the individual; but is indwelling in the individual, otherwise the instinct would be

functional without intermission, which is not the case. Again, the end is always constant, though the means vary greatly with external circumstances, which sufficiently proves that the unconscious willing of the end in view is the function of the unconscious mind, which reveals itself in instinct.

There is a prevailing opinion, which has unfortunately been fostered rather than discountenanced by scientific writers on psychology, that instinct ceases in the animal kingdom with the appearance of the higher reasoning powers in man. That conscious reflection in the latter can adjust instinctive actions or means so as to bring them more into accord with the requirements of a changing environment, is all that can be truthfully admitted. Man is the creature of instinct as much as any other animal, the only difference being that in willing the means to an unconscious end he is capable to a certain extent of adapting his actions to social and ethical standards, which latter are, however, in themselves instinctive principles, whether we regard them as intuitive or developmental. A brief allusion to the more important human instincts will help to confirm what has just been said.

The instinct of reproduction is one of the most powerful of these. It dominates human life to an extent that is the more surprising the further one inquires into its phenomena. In a thousand different ways it forms the fulcrum of action, of conduct, and of opinion. Being a primary instinct, it permeates every domain of human existence and sustains the superstructure of human institutions, which appear superficially to have no connection with it. But it is in the individual life that its particular influence, so far as concerns our present purpose, is most deserving of notice. We have seen in a former chapter the influence of the appearance of the reproductive sense in the mental disposition and the physical conformation of the individual. These are the results of the unconscious implantation by nature of the means to an (at that time) unconscious end. The process does not, however, end there. The next step is the implantation of an increasing impulse to the performance of the act of sexual reproduction. The fact that this impulse in more highly civilised man is held in check by conscious reflection under the influence of

social and ethical laws in no way detracts from the irrational character of the impulse itself, which demands satisfaction in spite of reason, which does not enter at all into the formation of the impulse. The aim of nature in implanting the sexual instinct is, of course, the propagation of the race; but in the impulse towards reproduction the consequence of the act is not present as an inducement in the mind of the individual either before or during coitus. Were this the only reward, mankind, especially the more highly civilised and cultured portion of it, would have turned with abhorrence from the performance of a disgusting and degrading action, and the race would ere now have become extinct. In order, however, to overcome the repugnance, the individual is deluded by the powerful anticipation of a pleasure which is far from being realised in experience. In the language of Von Hartmann and Schopenhauer, "the instinct of love provides for a composition and constitution of succeeding generations, corresponding as far as possible to the Idea of the human race; and the dreamed-of bliss in the arms of the beloved one is nothing but the deceptive bait by means of which the unconscious deludes conscious egoism and leads to the sacrifice of self-love in favour of the succeeding generation, which conscious reflection could never effect by itself. . . . The want of proportion between means and end (love, passion, and offspring) appears, when once comprehended, absurd to the consciousness of the individual, and the process of love is charged for him with an inner contradiction to his egoism, which at the most may be brought by deeper insight passively to permit Nature's ends to be accomplished in preference to its own." [1]

Closely allied to the sexual instinct is that of maternal love. The maternal instinct cares for the young animal so long as it is unable to care for itself, and the period of childhood in general lasts longer the higher the class stands in the animal scale. Not only so, but the maternal instinct becomes more extensive and important the higher we ascend in the animal scale, not zoologically but psychologically. So that animals which stand mentally higher learn more from

[1] Von Hartmann, *loc. cit.* vol. i. pp. 234, 235.

the instructions of their parents than is usually believed, since "Nature never makes use of double means to an end and refuses instinct where it has granted the means for conscious performance or acquisition."[1] The long duration of the parental care in the human child is merely a special case of the above law. That the maternal love has no firm basis on conscious reflection is also certain, for Nature does not trust to reason for the performance of the interests which she has most closely at heart. The maternal love is not amenable to reason, and can neither be initiated nor dissolved by an appeal to reason. Its true instinctive character is, however, placed beyond any doubt by the fact that it is self-sacrificing, even extending to the sacrifice of life by the parent for the sake of the child. Space will only permit of the mention of a few of the other human instincts. On the one hand there are the instincts of self-preservation, including the aversion to death and to noxious substances of diet which excite disgust, of acquisition, self-aggrandisement, and ambition. In blindly following these instincts the individual labours always under the belief that he is working for his own welfare, whereas he is but the tool of a higher power which uses him thus unconsciously for the good of the race. On the other hand are the instincts of sympathy and compassion, which lead to benevolence and the leavening of progressive society with the spirit of altruism. Because a man is sympathetic and compassionate he is the most likely of all to deny to himself any credit therefor. On the contrary, he not unfrequently deplores what he considers only a sign of weakness; nor does it ever occur to him as a general rule that his soft heart is an instrument of the unconscious for its own end.

Reflex action is a function of all nerve centres. The stimulus which reaches a sensory cell in the central organ by means of an afferent nerve overflows into a motor cell and becomes apparent in muscular movement through the mediation of an efferent nerve. Such is the generally accepted view. The process, however, is not quite so simple. Sensation in a nerve cell implies consciousness of some kind; otherwise we fall back upon the mechanical theory which regards the living

[1] Von Hartmann, *loc. cit.* vol. i. p. 214.

highly complex nerve cell as a species of electric battery, and the reflex mechanism as being somewhat similar to an electric bell, where, as a consequence of the pressing of a button, a current is liberated and the bell hammer coming repeatedly into contact with the gong causes the required sound. The liberation of the motor impulse by the motor cell is purposive, and therefore to a certain extent intelligent. These two functions—consciousness and purpose (or perception and intelligence)—are, it may appear, extravagant attributes to apply to the process of reflex action, and yet there is no middle course between accepting this view and descending to the grossest mechanism in our conception of the functions of the nervous system. We have already discussed the teleological psychical activity of such low forms of life as the amœba. Can we deny an equally high psychological development to the component parts of the nervous system of man? Fortunately there are stronger arguments from the animal kingdom in favour of our view. Volkmann removed the cerebrum and cerebellum from some young dogs, sparing the medulla oblongata. When he seized the animals afterwards roughly by the ears, they tried to get rid of his hand with their fore-paws. In the classic experiment with the decapitated frog, when the skin of the back was stimulated with acetic acid the animal tried to remove the irritant with the leg of the same side; but when that limb was removed it used the opposite leg for the same purpose. Now, the moving of a limb is at any time a complex and complicated act, involving the opposed action of flexor and extensor muscles in different proportions and with varying intensity at each of the numerous stages of position through which the limb passes. In the above two experiments ordinary conscious action, as we understand it, is excluded by the removal of the entire brain. Nothing, therefore, remains but to conclude that consciousness, as manifested in perception of the stimulus, and purposive, appropriate, and consequently intelligent action for its removal, is present in the spinal cord. Nor can this phenomenon be explained on the theory of accustomed nervous paths being made use of mechanically, for in varying positions of application of the stimulus the same motor fibres react, and no mechanical theory

of conduction can account for the reactions which follow the passage of the stimulus to different spinal centres. But again, if the spinal cord be divided longitudinally, the reflex movements become limited to one side; but if at any part whatsoever a connecting bridge be left between the two lateral halves, the reflex movements become bilateral. Reflex action is, therefore, another example of unconscious mind, and when we inquire a little further, we find that the brain itself is a reflex centre and that its reflexes may enter or not into our higher consciousness.

One of the most important reflex actions of the cerebrum is that connected with the various sense perceptions. When a stimulus affects a sense organ, a reflex movement is produced which has the effect of bringing the particular sense organ into the proper position and tension requisite for clear perception. This reflex is involuntary and unconscious, and although it may be voluntarily effected, yet the involuntary action is quicker and more effective. Other reflexes originating in one sense organ implicate other organs of the body and other parts of the brain. For example, through the medium of the ear reflex, movements are set up in the organs of speech by means of which children and certain animals learn to speak and reproduce melodies by the involuntary impulse which compels them to reproduce what they have heard. In thinking, there is a tendency to reproduce the muscular movements of the words thought, and some men think aloud. A still more suggestive operation of the brain is that which takes place in the complicated performance of reflex actions suddenly occasioned by stimuli apart from voluntary conscious interference. Thus, the eye not only protects itself reflexly from injuries which it sees approaching by closing of the eyelids, but it also protects other parts of the body by bending of the head and body, holding up of the arms, running away, or other similar actions. In such actions, for instance, as catching a falling body, parrying a thrust in fencing, ducking the head at the approach of danger, balancing oneself in a sudden slip, leaping over an obstacle, consciousness does not enter at all. They are too quickly performed to allow of conscious interference. Moreover, they are more accurately,

more gracefully, and more suitably performed than they could possibly be as the result of conscious reflection. Conscious voluntary action is not only slow, but its deliberativeness is inhibitory and disturbing to many complicated reflex actions. This is seen in the extraordinary feats of some somnambulists, who in an unconscious state are able to climb in places where in waking moments such actions would be impossible. For the same reason, it is well known that mules walk more surely and safely than men in dangerous places. "Consciousness," says Von Hartmann, "can decompose movements to a certain extent, and give a conscious impulse to any partial movement (this is indeed the way we learn to make the movement); but, in the first place, every such partial presentation will probably find no other path to the muscles than through the grey matter of the motor centres, thus always retaining the character of a reflex; secondly, even the simplest motor elements accessible to the cerebral consciousness are capable of executing highly complicated combinations of movement, into which consciousness never penetrates (*e.g.* the utterance of a vowel, or the singing of a note); and thirdly, if its simple elements are each specially intended by the conscious will, the whole movement has something extremely slow, coarse, awkward, and heavy about it, whilst the very same movement is executed with the greatest facility, speed, certainty, and elegance, if only the final result was intended by the cerebral consciousness, and the execution was entrusted to the motor centres in question."

It remains to compare the results of the foregoing remarks and to deduct their significance. We have seen that the perception of a stimulus and the will to move are functions of the lowest forms of life with which we are acquainted; also that the nerve centres of the spinal cord and ganglia possess the quality of independent sensation (sub-consciousness) and the purposive willing of complicated movement. That to certain sympathetic ganglia and to the vital centres in the medulla we must logically attribute a form of independent consciousness, has also been shown. We have considered the important fact that the most complex reflex actions in the brain are capable of accurate performance independently of conscious-

ness; indeed, that consciousness is rather inhibitory than otherwise to their accurate and speedy performance. Finally, we have attempted briefly to expose the unconscious element underlying the instincts, which form such a preponderating part of animal life. It must be understood that only the fringe of this great question has here been touched upon, and that the preceding list of unconscious phenomena by no means exhausts the manifestations of the unconscious mind as displayed in bodily life. The plastic and reparative energies and the complex nutritive and assimilative functions might all be cited as evidence of the same fact, did space permit.

From all these facts there appears but one conclusion to be drawn, which is, that an immediate intellectual intuition, call it "Vitalism," or call it the "Unconscious Will," pervades living matter of every kind; that the higher forms (*e.g.* man) are specially organised compounds of vital units endowed with an instinctive functional purposiveness; that the sum-total of the unconscious psychical life of these units forms the unconscious unified mind of man; and finally, that man, in common with all animals, is conditioned and limited by the "Unconscious Will," through instinct and otherwise, to certain paths of conduct for the attainment of certain definite ends.

The Conscious Mind.—Consciousness is not a state, but a series of changing states which vary incessantly with the subject of consciousness. Consciousness also varies in degree from the greatest intensity to a point that falls to the threshold of consciousness, which is its zero point. Consciousness and attention are co-extensive terms; probably they are also synonymous terms. "It may be said that we are conscious of many things, but do not attend to them; to which I am tempted to reply that it is the attention which is the consciousness, and that unconsciousness, which is not consciousness, because it does not attend, is not properly consciousness."[1] Consciousness is the search-light of mind, capable of plunging into almost all the recesses of our sub-conscious mind and illuminating it. We can call into consciousness by a voluntary effort any part of the body, until its ordinarily unconscious sensations attain a painful magnitude. We can concentrate

[1] Maudsley, *Physiol. of Mind*, p. 96.

consciousness upon a sensory pereeption, upon a voluntary movement, or upon an abstraet idea. Consciousness, however, has a limited power of attention. It eannot embraee intensely more than one subject at a time. For instanee, in listening to an orchestral concert we receive into eonseiousness the general effect of the harmony of a number of different musieal instruments ; but it is possible to eoneentrate attention upon a single instrument, only, however, at the eost of dropping to a large extent from eonsciousness the general effect of the combined whole. Conseiousness is an indispensable part of mental life, for it records every sensation which is of sufficient intensity to rise into it, and becomes aware of every fresh movement which involves difficulty in its early performanee ; but so soon as practiee renders the elements of the movement easy of performance it may sink for ever into sub-consciousness ; and it is vividly present in the eomparison and diserimination of every new thought and idea. Through this awareness of sensory perception of voluntary movement and of ideation, consciousness is the necessary medium of all edueation, henee of mental development, and finally of the enhaneement of its own functions. The development of eonsciousness, which is logically the great aim and end of nature's scheme of the evolution of life on this planet, is, therefore, a constant proeess. But in this development the sphere of eonseiousness itself does not apparently increase. It remains, if one may use the simile, the digestive apparatus of mind, whieh is eonstantly receiving fresh material from the uneonseious mind in the shape of sensory pereeption, and eonstantly returning it after treatment back to sub-eonseious regions. Consciousness only reeeives, however, sensations whieh the uneonseious mind chooses to give it, or sensations which, on aecount of their intensity, foree themselves beyond the limit of the uneonseiousness. "The brain not only receives impressions uneonseiously, registers impressions without the eo-operation of conseiousness, elaborates material unconseiously, ealls latent powers into activity without eonseiousness, but it responds also as an organ of organic life to the internal stimuli whieh it receives uneonseiously from the body.[1] The grounds for sueh a view,

[1] Maudsley, *loc. cit.* p. 35.

which is undoubtedly a correct one, have, to a considerable extent, been already gone over in the preceding pages. Other grounds are so remote from consciousness that it is difficult to deduce them. We are aware that feelings and ideas constantly emerge independently from our sub-consciousness, which are new and startling. Solutions of difficulties, new schemes, fresh impulses to action spring suddenly into consciousness from we know not where. All we can predicate of them is that they are novel and previously unknown. Men have awakened from sleep with the solution of a troublesome problem bright in their consciousness, and others have dreamed dreams which have proved of great service to humanity. According to Wundt, the origin of sensuous perception and of consciousness in general depends on unconscious logical processes, since the processes of perception are of an unconscious nature, and only their results are wont to appear in consciousness. He says: "The unconscious logical processes are carried on with a certainty and regularity which would be impossible where there exists the possibility of error. Our mind is so happily designed that it prepares for us the most important foundations of cognition, whilst we have not the slightest apprehension of the *modus operandi*. This unconscious soul, like a benevolent stranger, works and makes provision for our benefit, pouring only the mature fruits into our laps."[1] All our most vivid feelings spring from unconsciousness, and the whole practical life of most men is as remote from consciousness as the motions of the planets; and if this is the case with regard to vivid sensations, what must it be with regard to fainter sensations; and the still fainter revival of previous sensations, which so largely bulks in our mental life? We have previously stated that mind and consciousness are neither co-extensive nor synonymous. It has now been shown that the greater bulk of our mental processes do not enter consciousness; that the basis of thought is unconscious mental activity, which during health proceeds uninterruptedly, unerringly, and unconsciously. "The unconscious," says Von Hartmann, "does not fall ill; the unconscious does not grow weary; but all conscious mental activity

[1] Wundt, *Beiträge zur Theorie des Sinnes Vermehrrung.*

becomes fatigued." Consciousness, finally, is not mind, but an incidental quality of mind, which has the power of exercising a discriminating and an inhibitory action on certain formed, mental processes.

Sensations vary in intensity and in quality. There is a minimum and a maximum degree of excitation of sensation by external stimuli, which follow definite laws, so that the intensity of a sensation may be represented by a curved line that rises at first abruptly and swiftly from a point representing the minimum of stimulation, then more and more slowly, until at a point representing the maximum of sensation it becomes a straight line parallel to the axis of abscissas. There is thus a safeguard on the one hand which prevents the entrance into consciousness of innumerable sensations below the minimum or threshold of sensation, and on the other, which prevents the entrance of too intense sensation above the maximum. The quality of sensation depends generally upon the organ receiving it, and consequently we recognise five modes of sensation—smell, taste, sight, hearing, and touch. Touch and hearing depend upon mechanical stimulation of the sensory end organ, the other three upon chemical stimulation. Our ideas of space depend upon the senses of seeing and touch, whereas the remaining senses are capable of very indefinite localisation. The power of localising sensations in space depends upon hereditary habit, upon experience, but more especially upon the association of the sensation with numerous ideas of sight, motion, and speech. That this latter explanation is true is shown by the phenomenon known as "eccentric projection," where after the amputation of a limb, it may be many years previously, electric stimulation of the nerves of the stump produces in the subject sensations which are referred to the absent fingers or toes, as the case may be. Besides intensity and quality, sensations are generally accompanied by an emotional tone or tone of feeling. The tone of sensation depends upon its intensity, upon the corresponding ideas which it is capable of arousing in the mind, upon the quality of the sensation, upon its spatial arrangement, and upon those properties that have reference to time.

When a stimulus proceeding from an external object

affects a sensory end organ, say, for instance, the eye, it is conveyed by the optic nerves to the corpora quadrigemina and pons, and from thence to the cortical centre in the first temporal convolution. It there reawakens the organic memory of former similar sensations and is by this act said to be perceived. The reawakening of the organic memory of the cortical cells by every sensation which enters consciousness makes it thus an almost impossible feat to distinguish sensation and perception in ordinary practical life. What is the organic memory of a nerve cell? Psychological writers have done much to confuse our conceptions on this point by the use of such terms as "latent images," "memory pictures," and phrases of a similar kind. The brain is not a canvas upon which the results of previous sensations are graphically painted. No microscope and no chemical analysis can ever discover these latent traces of former sensations, for the simple reason that they do not exist. The image that falls upon the retina is transformed by chemical stimulation of the nerve endings into a nervous current to the central cells, which are thereby thrown into specific activity varying according to the character and intensity of the stimulus and the familiarity or not of the centres with the peripheral impression. The only equivalent connection that we know of as existing between the impression and the specific activity of each sensory centre is one of vital energy, so that the peripheral stimulus and the sensation bear to each other no resemblance, and the latter is not a counterpart of the former. We have to distinguish an hereditary and an acquired memory of the sensory centres. The one is intimately related to and dependent upon the other. When the chick breaks its shell it is at once able to the best advantage to distinguish between a grain of corn and a grain of sand by reason of its hereditary organic memory; and because in the human child the cerebral centres are of slow development it is both foolish and illogical to conclude that all his mental development is the result of painful and slow acquisition from experience, and that heredity does not enter into the formation of the organic memory to the same extent though much more slowly than into that of the chick. The acquired memory of our sensory centres is dependent upon

their recurrent stimulation by peripheral impressions of varying degrees of intensity and of various shades of resemblance and dissemblance. Similar impressions recall and unite themselves to residua of previously experienced similar sensations (ideas), and are combined with the experiences of other sensations in other sensory centres, and with all or many of the ideas that had formerly been aroused by such sensations on previous occasions. This general mental act is known as a concept. Of the process of perception we are entirely unconscious; we only recognise the concept or percept logically prepared for us by the unconscious mind when it is presented to our consciousness.

The similarity or dissimilarity of objects of sensation is judged of by the mind and accurately classified, not merely by the sensory impression upon the cortical centres, but to a much greater extent by the train of residual sensations and ideas which it arouses. When, for instance, we hear the word "orange" spoken, the colour, form, fragrance, and taste of the fruit occur to us, and we form the idea "orange." The idea "orange" is thus seen to be a complex one made up of "ideas" of hearing, seeing, smelling, touching, and tasting. In addition to the auditory idea aroused by the word heard, there are other ideas aroused, such as the idea of writing the word, of speaking it, or of seeing its letters in print. When we consider the location of these sensory areas in the cortex and the distance that separates them, we see at a glance how each complex idea involves large tracts of the cortex connected together by the association fibres of the ideation centres of Flechsig. It is almost beyond a doubt that the component ideas forming a complex idea exist twice in the brain, once in each hemisphere; but in man the linguistic ideas both of hearing and articulation are deposited in the two specified regions of but one hemisphere, generally the left. From concrete complex ideas the transition is a gradual one to general and abstract ideas. A much greater generalisation is required for the conception of the idea "fruit" than for that of "orange." When we conceive the idea "fruit," and think of what is meant by it, an innumerable number of loosely associated ideas representing various different kinds of fruit rise up before us and also ideas of the spoken, written (or printed),

and heard word. The speech ideas are here of all importance, for the loosely combined ideas which form general conceptions could not cohere at all in inarticulate animals. It is to the faculty of speech, therefore, that we owe our power of generalising ideas; much more so do we owe to it our power of abstract reflection. An abstract idea may be defined as one which cannot be directly reduced to sensations, and is in fact formed by the combination of complex ideas and by the recombination of these again so far as the mind is capable.

Ideas possess, like sensations, the properties of quality, intensity, and tone, as well as reference to space and to time. The quality of an idea is known as its "content" or that to which it refers; thus the idea "orange" has a totally different content from the idea "soldier." The simplest reflection demonstrates to us the fact that ideas differ in intensity or vivacity or distinctness. This intensity does not depend upon the "content" of the idea, but upon other and extrinsic qualities, such, for instance, as its relation to the personality of the individual, or its novelty. The emotional tone of ideas varies greatly in accordance with their associations and relations with preceding ideas of pleasure or pain.

Ideas are not, as a rule, projected into space like sensations, but they nevertheless acquire a spatial character from the sensations upon which they are based. Thus our ideas of a house or a tree or a landscape are decidedly spatial in character. In the same way ideas partake of the character of time, but they also possess a property of time dependent upon their duration and sequence in consciousness.

The association of ideas is of two kinds. An idea may reproduce as its successor one that is similar to it in "content," or one with which it has often appeared simultaneously. Ziehen [1] calls the former "internal" or association by likeness or similarity, and the latter "external" or simultaneous or synchronous association. Although a sensation associates itself with a similar idea, yet the idea thus awakened calls forth as a rule only ideas with which it has been previously simultaneously associated. The law of "external" or simultaneous association of ideas is by far the most common and

[1] Ziehen, *Physiol. Psychol.* p. 178.

the most important. "The entire process of education is based upon the endeavour to awaken related ideas in the child simultaneously. The child asks, 'What is that?' and he is answered 'A tree.' Thus an external association between a visual idea and an idea of hearing is established. The ideas of sight and hearing are wholly unlike each other, but by virtue of constant simultaneous appearance they become very closely associated."[1] The "internal" association of ideas is on the other hand very superficial, and is limited to the acoustic ideas of words that sound alike. It is very commonly observed in acute mania, where there is great cerebral excitement with disturbed association.

The association of complex ideas follows the same law as does that of simple ideas, and those complex ideas which have one or more component ideas in common reproduce each other externally or by reason of their similarity, as might be expected. Thus, the ideas of sleep and death have the component ideas, "rest" and "unconsciousness" in common, and being thus contiguous ideas may reproduce each other simultaneously.

Some writers have written of the "contest of ideas" in their struggle to enter consciousness. It is certain that only one idea can be present in consciousness at a time; but a struggle between abstractions is absurd and inconceivable. The so-called struggle is but the adjustment of the elements of the unconscious mind preparatory to presenting the ideas to consciousness. Regarding the processes of the unconscious mind we must always remain in ignorance; yet one or two factors that predispose to the election of certain ideas for conscious representation over others are self-evident. Ideas that have *recently* been frequently associated with a conscious idea have a better chance of election because of their greater intensity. All ideas accompanied by a vivid emotional tone, whether painful or pleasurable, make a stronger claim on attention. A third factor of great importance also probably operates upon the rise of ideas into consciousness. It was first propounded by Herbert, and has since been widely accepted as a working theory to explain certain mental phenomena. It is that latent or unconscious ideas stand in a complicated

[1] Ziehen, *loc. cit.* p. 179.

reciprocal relation to one another; they mutually arrest or incite each other. "In consequence of this reciprocally arrestive and incitant influence, an idea that is affected chiefly by arrests may be overcome in the contest of ideas despite its greater distinctness, its more vivid emotional tone, and its closer association with the initiative idea. On the contrary, an idea that is perhaps less favourably conditioned as regards these three factors, but that is aided by the incitant influence of other latent ideas and by the absence of any arrestive influence may be victorious."[1] This process is known as the "grouping" of latent ideas. Upon this hypothesis we may construct a tolerably good explanatory theory of certain changes in the current of our daily thoughts, for it is certain that one idea starts one train of thought to-day, and may to-morrow enter into associations of an entirely different kind; but as an adequate explanation of the processes of the unconscious mind, which has undoubtedly power at times to present to consciousness ideas of whose relations we are entirely ignorant, it is hopelessly inefficient.

Ideas are associated with great rapidity in normal states; but the degree of rapidity varies in accordance with certain known conditions. Complex ideas associate themselves more slowly than simple ones. States of bodily exhaustion retard association. Toxins in the blood or impure states of the blood have a great effect in disturbing the association of ideas, either in the direction of facilitating it abnormally or retarding it. The influence of alcohol is in this respect suggestive; small doses undoubtedly facilitate association, while increasing doses paralyse it until finally the power to associate is entirely lost. Emotion influences greatly the rapidity of association; pleasurable emotions cause rapid and extensive association, while painful emotions retard association. Extreme examples are furnished by cases of mania and of melancholia. In the former association is so rapid that it becomes first superficial (internal), as evidenced by the rhyming of words and incoherence, while in the latter association is so slow that a long interval occurs between the occurrence of stimulation, as in asking a question, and the reaction or reply to the same.

[1] Ziehen, *loc. cit.* p. 186.

Finally, practice in any particular direction makes association very rapid by means of the acquired faculty of skipping over intermediate and subordinate ideas, and associating only the primary and important ideas.

Attention is an attribute of consciousness. Consciousness is, as has been pointed out repeatedly, a quality of unconscious mind. As we do not know what mind is, we cannot even speculate as to the origin of consciousness, though some writers have been foolish enough to give us their views on this subject on physiological bases. The problem, if it exists at all, belongs exclusively to the domain of metaphysics and lies entirely outside the scope of the physical sciences. We only know consciousness as the faculty of attention, and regarding the latter several important points in its processes bear directly upon psychiatry. Attention varies in its intensity; but only one sensation or group of sensations or one idea or group of ideas can be fully the subject of attention at one time. Let us consider briefly what occurs when a sensation occupies attention. In the case of an impression falling suddenly upon the retina, the eyes are turned and fixed in the direction of the object by means of the oculomotor muscles; the head and even the body may be turned partially round; and the pupils are focussed to bring it better into vision. The latter movement is, however, unnecessary for our purpose. In attention to a sound sensation the tympanum is tightened, and the head is inclined towards the direction of the sound. In touch sensations the skin muscles are rendered tense, and in smell and taste various special movements of the lips, tongue, and face occur. Attention to sensations is, then, always accompanied by a reflex muscular movement. There is also an idea formed corresponding to these movements, by means of which the localisation of the sensation in space is facilitated. In electric stimulation of the stump of an amputated limb the sensation of the movements of the absent fingers and toes is present in consciousness. This concomitant muscular movement is also present when attention is occupied with abstract ideas. Our abstract thoughts are, as has already been stated, dependent upon the faculty of speech, and as they pass in review under attention the muscular movements of articulate

words enter into the composition of our ideas, or the sight of the printed words rises before us. In many people study is accompanied by a succession of visual pictures. Again, in all intense thought there is a feeling of muscular tension and exertion, which is often visible in contraction of the facial muscles of expression. From all this it is clear that attention is always and necessarily accompanied by muscular contraction, which is one of its symptomatic features.

In addition to motor innervation, the fixing of attention upon a sensation has the effect of increasing its sensibility by facilitating the transference of the sensation along the afferent nerve tract. Thus, when attention is on the strain, persons feel, see, or smell weak impressions more acutely. This may be due to the fact that other sensations of an arrestive character are inhibited, or that the peripheral ganglion cells are rendered more sensitive. It is the same with ideas and groups of ideas. When attention is fixed upon an idea it is retained in consciousness until all corresponding ideas are associated with it, so far as that is possible at the time; all unrelated ideas are inhibited; and the association of related ideas is facilitated to the greatest possible extent. Attention, on the other hand, if too active, is inhibitory to the best and most successful thought. The thinker who is actively attentive to the succession of his ideas is thinking to little purpose. Attention is, however, plainly essential to the proper formation and development of mind. In the absence of a proper faculty of attention there can be no thorough training, for only those who have the power of sustained attention can acquire lasting and accurate impressions of any subject.

The fact of conscious attention naturally involves the question of the Ego. The Ego is itself a complex idea composed of the total of our present ideas and inclinations, plus the memory of our successive most important mental and physical experiences in the past. The unconscious mind recognises no Ego. It is only in conscious thought that we instinctively regard the Ego as a centre interposed between ideas and judgments or actions, and as the cause of these ideas and of their results. But even in conscious thought the idea of the Ego is not always present.

Memory is of two kinds, recognition and recollection. From what has been said previously we must regard each nerve centre as being possessed of its own special memory. Even in the simplest reflex action there is an organised memory, which is either hereditary or acquired, more correctly, both conjoined. The total sum of all the memories of these centres constitutes the memory of an individual, or his memory proper. These isolated memories are unconscious, notwithstanding that in the acquisition of some of them consciousness may be partly present. In acquiring a new and complicated movement, consciousness is undoubtedly present, often painfully so; but consciousness only wills the end; the means are worked out unconsciously by the individual nervous centres, which unconsciously thereby develop a new memory of their own. When the memory is completely acquired, the conscious effort disappears, and its reappearance is more of a disturber of the harmony of the movement than an aid to it. We never know a thing thoroughly until we can do it unconsciously. To talk of "latent images of memory" or "idea pictures" in this connection, is to talk nonsense. We might as well speak of the latent images of an innumerable ancestry possessed by the newly impregnated germ cell. We are dealing with vital, not with physical laws, and the introduction of a natural terminology is not only confusing, but misleading. All we can truthfully affirm is that the first activity leaves behind it some after effect or modification of the nerve elements, whereby the nerve current is more readily disposed to pass in the same direction again. Now when a sensation enters consciousness, not only does it pass along accustomed paths of association in conformity with the law just stated, but it is at the same time *recognised* as having been formerly experienced. It is the same with an idea or group of ideas. They form again their old associations and are recognised by consciousness as former experiences. In this way also new ideas and new sensations are discriminated and classified according to their powers of association and the degree to which they arouse recognition.

Recollection, on the other hand, is the voluntary recall into consciousness of facts that have been forgotten. The

actual revival is an unconscious process, "for it is plain that if we were conscious of what we want we should not need to recollect it . . . and it is furthermore plain that a definite act of volition recalling it must imply a consciousness of it, inasmuch as it is impossible to will what we are not conscious of." [1] The process of recollection, therefore, consists in fixing in attention certain related ideas to those we wish to revive, and to trust to their power of associating themselves with those which we wish to recall. When that fails, the best way often is to allow all thought on the subject to pass from consciousness; after a longer or shorter time the unconscious mind of itself may suddenly usher the desired fact into consciousness.

Memory is subject to great variations, depending upon the bodily health, the states of the blood, and other circumstances such as we have considered as affecting the association of ideas; for memory and the association of ideas are but two sides of one and the same process.

Hitherto we have only considered one side of the psychical process, namely, the initiative side commencing in sensation and ending in ideation. The psychical process is a huge and complicated reflex action, the sensory portion of which is followed by motion or action. Following upon a voluntary motion there are aroused reflexly ideas of the motion, which, linked on to preceding sensory ideas, form together with them a concrete idea of the motion performed. Motion itself is essentially unconscious; it has no psychical concomitant, but its ideas enter largely into mental life, and as they increase their associations, they form, through the aid of memory, a most essential portion of our psychical existence. A sensation is able to produce motion reflexly. We know that an idea is also capable of resulting in motion. The process in both instances is performed by the association of ideas, attended by the revivification of latent memories, either conscious or unconscious. The resulting motion is called in psychological language "action," and the time taken in the performance of the reflex excitation of the nervous elements concerned is termed the reaction time. The reaction time has been accur-

[1] Maudsley, *Physiol. of Mind*, p. 519.

ately measured for simple muscular actions, and it is found in health to vary for different stimuli from one-tenth to one seventeenth of a second. Conscious thought, physical exhaustion, the arrestive influence of other sensations, morbid states of the blood and certain mental affections, especially melancholia, considerably lengthen the reaction time. These influences, it will be noted, are just those which tend to inhibit the normal association of ideas.

Action is as strictly necessitated as thought, for both depend upon association of ideas, over which we have but a limited control. Our actions are the result of the strongest desire or motive present for the time being. Most of the antecedent ideas forming the desire to act or not to act are not present in consciousness. At the same time we have the consciousness of effort in the formation of judgment upon the act, which suggests the idea to us of a special will faculty acting with arbitrary energy; and when the volition becomes active we have the consciousness of power in the discharge of the innervation. From these feelings have arisen the idea of a free faculty termed the Will. Since volition depends upon previous association of ideas, its scope, character, and aim must depend upon the extent, quality, and character of these associations as modified by heredity, by cultivation and by bodily conditions. "A man can never will a virtuous end into whose reflection ideas of virtue do not enter. . . . The will, then, is radically the result of desire or aversion sufficiently strong to produce an action after reflection or deliberation."[1] We must recognise, therefore, two elements in will formation, the intellectual or regulative element and the æsthetic or dynamic element, the latter being either a sensation, an appetite, or an emotion. The preceding remarks are sufficient to show that the will is not a self-generating entity, but is dependent on antecedent causes. Its influence over bodily movements and mental action is moreover not nearly so great as is generally supposed. We know that it has no power over certain movements that are essential for organic life: we have shown that in complicated bodily movements it wills the end, not the means; and that it has no

[1] Maudsley, *loc. cit.* p. 427.

power to effect movements that are confessedly voluntary until they have been very carefully acquired by practice. In mental operations, as in movements, the power of the will is limited. The association of ideas follows definite laws which the will cannot control, although it may modify greatly by habit and cultivation their power of entering consciousness. An unpleasant idea will recur again and again to consciousness in spite of all efforts to expel it. Moreover, when it is expelled, it is not by a direct effort of will, but by fixing the attention upon some other idea, for two ideas cannot exist synchronously in consciousness. By what power one idea calls up another we do not know—only that it is not by the will.

Lastly, we shall say a few words concerning emotion. The unhampered performance of physiological action is attended by pleasure. Pleasure is the psychical concomitant of activity, expansion, and the process of pursuing the natural desires of the individual. The desire of the individual is towards self-achievement in all directions. The checking of that desire at any point is attended by pain. Consequently all sensations and ideas that correspond with forces inimical to the organism possess instinctively the emotional tone of pain, and suggest hostility—a desire towards defence or escape; and all ideas and sensations that correspond with forces favourable to the growth, increase, and perpetuation of the organism are pleasurable and attractive. But a further analysis is necessary, for it is well known that the same sensation or idea may be at one time positive or pleasurable, at another time negative or painful, while many sensations and ideas are neutral. On what depends these variations in tone? The tone of sensation evidently depends upon the intensity of the stimulus. For instance, a simple musical tone lightly struck is generally neutral, but as the tone gradually swells, feelings of pleasure appear and increase slowly. If the intensity of the musical tone is increased, the feeling of pleasure gradually diminishes and finally passes into a feeling of pain. Similar effects can also be produced in the case of any one of the other senses. The regularly periodic vibrations of musical sounds impart a pleasurable feeling, while the irregularly periodic vibrations characteristic of noises are not accom-

panied by pleasurable feelings, more often by painful ones. Again, long duration of a sensation, or the rapid succession of similar ones becomes wearisome, and eventually painful, even though the original sensation may have been pleasurable. But when the intensity or the duration of single tones is subjected to a more or less periodic change, as in poetry or music, they become pleasurable. With regard to ideas, it may be said that they generally assume the emotional tone of the sensations upon which they are founded; but an idea of one tone may assume by association with other ideas a tone of a directly opposite character and one different from its fundamental sensations. A recognition of this fact is of the very greatest importance in understanding the phenomena of certain mental diseases. We have already seen that the emotional tone of an idea is a most potent factor in determining its association; and now we see that it also engenders a train of thought characterised by a similar emotional tone, because ideas of a pronounced tone force themselves more into consciousness.

The physical condition of the nerve centres also modifies the emotional tone of sensations and ideas. When through any cause these centres are excitable and hypersensitive, a sensation or idea which is neutral or slightly pleasurable may become painful; and when from any cause there is imperfect association of the centres a perversion of the ordinary feelings takes place, whereby in retarded association all ideas experienced are painful; and in too rapid association all ideas are pleasurable.

Finally, the emotions are outwardly expressed by certain physical signs and corporal attitudes, which are well known as outward manifestations of joy or grief. And it is extremely significant that the outward intentional posturing of these attitudes is attended by a concomitant realisation of the internal experience of the corresponding emotion.

Emotions are the well-springs of action. Founded upon the instinctive necessity of recognising those factors which are helpful or baneful to the organism, they pervade the whole psychical life; they keep pace with its evolution; and become modified and educated with the growth of conscious intellectual judgment and control.

CHAPTER VII

PATHOLOGICAL SYMPTOMATOLOGY

I.—Hereditary Degeneration

Insanity is not a chance occurrence, like a nasal catarrh or an accident, or like an attack of typhoid fever to which all men are liable. There are certain necessary preceding conditions, one of which is essential, namely, that the brain of the subject must be predisposed by heredity to mental breakdown. There are, it is true, other causes which may invalidate a previously normal brain and predispose it to insanity, such as alcoholic over-indulgence, traumatic injury, and some physical diseases; but such causes are comparatively rare. It may, therefore, be generally stated that in order to become a lunatic a person must inherit a vice of organisation, which, given the necessary circumstances, sometimes even in the absence of any special circumstances, will manifest itself in mental aberration. This vice of organisation is called degeneration.

Hereditary nervous degeneration may appear in predisposed persons either as vesanic heredity or a tendency to the insanities, as neurotic heredity or a tendency to the neuroses, or as congestive or cerebral heredity or a tendency to apoplexy, brain tumours, or other gross cerebral lesions. Although all nervous hereditary affections are transmutable in their transmission from one generation to another, we are only now concerned with vesanic heredity. The incidence of this form of hereditary degeneration varies much in degree in different persons, even in members of the same family, depending upon

the extent to which the implication of the ancestors is transmitted to the descendants. The following classification may illustrate roughly what I mean: (1) It may manifest itself only by trifling eccentricities, mannerisms, slight moral lapses or mild cerebral neurasthenia; (2) by isolated attacks of idiopathic insanity (mania or melancholia), dependent upon grave moral crises or physical deterioration; (3) by recurrent or alternating (*folie circulaire*) attacks of idiopathic insanity independent of any exciting cause; (4) by systematised progressive insanity; (5) by the appearance of hereditary insanity, *par excellence*—the insanity of the degenerate specially so called.

The use of the terms "hereditary insanity" and "insanity of the degenerate" by no means implies that other forms of insanity are *not* hereditary, but that in this form there is a grave and overwhelming weight of heredity, which fatally handicaps the individual, and which reveals itself by certain well-known signs (stigmata) both mentally and physically. According to the gravity and number of those physical and mental stigmata, the degenerate have been divided into a higher and a lower class. Among the higher degenerates the mental stigmata are usually few, and the physical stigmata often absent; while among the lower degenerates, on the other hand, especially idiots and imbeciles, the physical and mental stigmata are met with in profusion.

In normal heredity, as we have seen, the morphological characters of the race, of the family, and of the immediate ancestors are reproduced in the individual. In morbid heredity there is a failure in transmission of certain characters, which results in an *unlikeness* to the type of the race and to that of the parents; and this unlikeness reveals itself in various malformations and anomalies of development, which are called stigmata of degeneration. These stigmata therefore are not positive characters transmitted directly, but negative characters due to a want of the power to transmit complete qualities of organisation, and they must be carefully distinguished from accidental and pathological malformations due to intra-uterine or infantile diseases. These signs of degeneration naturally fall under the two heads of physical and mental stigmata.

A. The *physical stigmata* of degeneration are more easily remembered if classified under the different bodily systems to which they belong.

Congenital osseous malformations.—Microcephalism is generally the result of an arrest of development involving at the same time both the bones of the skull and the brain, and is seldom caused by premature synostosis of the sutures. Macrocephalism is usually the result of hydrocephalism. The skull is large and out of proportion to the face, which is small in comparison; but it may also be caused by an affection of development chiefly affecting the bones, but often the brain as well. Plagiocephalism—an oblique oval or reniform shape of the head—is probably favoured by slow ossification of the sutures or by asymmetrical development of one side of the head. Scaphocephalism, in which the skull is shaped like the keel of a ship, is due to the premature closing of the sagittal suture; while acrocephalism, in which the head is high and sugar-loaf shaped, is caused by premature ossification of the two coronal and the sagittal sutures. It is common to find in idiots, imbeciles, and the insane a contraction of the frontal regions of the skull, with a comparatively wide development in the occipital region, or *vice versa* (trigonocephalism). Wormian bones are often present in the lambdoidal sutures in the degenerate, so that the body of the occipital bone forms a triangular prominence, which can be felt at the posterior part of the head. Asymmetry of the head and face, which to a slight extent is probably a normal condition, occurs often to a marked degree in the degenerate. This asymmetry usually involves an unequal size of the two orbital cavities, and an unequal prominence of the orbital ridges and malar bones. The upper jaw, especially the dental ridge and the upper teeth, may be over-prominent, constituting the condition known as prognathism; while the lower jaw may be of enormous size, as is the case in many criminals, or comparatively too small and apparently atrophied.

The congenital deformities of the hard palate in the degenerate have received much attention. They have been divided by Clouston[1] into two kinds, as follows:—"The

[1] Clouston, *Neuroses of Development*, pp. 42 *et seq.*

'neurotic' palate," he says, "has a more Gothic arch, with the alveoli tending to run more parallel for a greater distance than the 'typical,' and with a much higher and narrower dome, the roof of which is formed by a larger part of a smaller circle. The 'deformed' palate is of various shapes, all abnormal, but the most common form is very high, very narrow, and at the top either V-shaped or saddle-shaped. In this class I would include, in addition to the more common or saddle-shaped, all the marked asymmetries, marked central bulgings along the line of ossification, great depressions where the intermaxillary bones join, and the cup-shaped hollows which we find in some cases in the centre." Finally, the palate may be cleft, which developmental deformity may or may not be accompanied by incomplete division of the soft palate.

True spina bifida is generally, though not always, inconsistent with continued life. According to Féré[1] latent spina bifida is more frequent, and is revealed by the presence of a patch of hair on the skin on the lumbar region. Spinal curvature is very often met with in the degenerate, and again according to Féré[2] the coccyx may present anomalies of development, one of which simulates the rudiments of a true tail.

Asymmetry of the thorax is said to be common in epileptics, while deep anterior grooving, funnel shape of the walls of the chest, defective development of one of the pectoral or deltoid muscles or of the cartilages, have been described.

With regard to the limbs, various anomalies in development occur. Chief among these are abnormal shortness and abnormal length of the arms; the latter is the more common. The same is also true of the lower limbs, which, when too long, are also often too slim. This deformity is common to the neuropathic and to the phthisical. The normal length of the fingers is judged by the standard of the middle finger; the index should reach to the point of emergence of the nail of the middle finger, the ring finger to the middle of the nail of the latter, and the little finger to the level of the last articu-

[1] Féré, *La Famille Nevropathique*, p. 272.
[2] *Ibid.*

lation of the ring finger. In the degenerate all the fingers may be too short, although sometimes they may be too long, but the most common defect is in the proportionate length of the fingers. Generally it is the ring and little fingers which, owing to faulty development of the ulnar side of the hand, are too short. The thumb may be too large (sometimes owing to the presence of an additional phalanx), or, as is more generally the case, too short. In graver forms of degeneracy are met with polydactylism (supernumerary fingers or toes), syndactylism (webbed toes or fingers), and ectrodactylism (absence of one or more fingers or toes). Among the more uncommon stigmata affecting the extremities may be mentioned congenital luxations of the hip joint, congenital ankyloses of joints, and limitations in the performance of certain common movements, such as pronation and supination of the forearm. Finally, such conditions as the various forms of club foot and analogous deformities of the hands, as also flat foot, must be regarded as stigmata of degeneration.

Special Sense Organs. The External Ear. — Cases of absence of the whole pinna have been recorded, but the most frequent defect is the absence of some part of the pinna, especially the lobule, which may be either awanting or adherent to the cheek. The external ear may be either too large or atrophied and shrunken in appearance. The pinnæ may be attached to the head almost at right angles, which is the case in many criminals ; the appearance is more striking when the person is looked at in front with a full-face view. Instead of arising gently from the concha, the helix may suddenly project as an eminence united on the one side with the antihelix, and on the other with the antitragus, and dividing the fossa of the concha into two separate cavities. Sometimes only the commencing ascending part of the helix is present, the incurved border being absent and the scaphoid fossa more or less completely effaced. This condition is known as Morel's ear. The helix may, in other cases, be enormously developed, so as to overlap the scaphoid fossa and the bifurcation of the antihelix, or it may be fused with the inferior portion of the antihelix. Darwin's nodule is an eminence on the postero-superior border of the helix, a little below the

commencement of its descending portion, which varies considerably in size from a minute projection up to a well-marked deformity, accompanied by defective development of the helix, and which gives to the ear an appearance of resemblance to that of the apes or of the higher mammalia. A similar conformation is found in the human fœtus from the fourth to the seventh month of intra-uterine life. The antihelix may be absent or of exaggerated size, and one of the branches of its bifurcation may be absent or duplicated. The antitragus may be small and reflected downwards and backwards, giving the cavity of the concha a round shell-like appearance. In other instances the antitragus may send a root into the fossa of the concha, which is joined to the root of the helix. Anomalous forms of the tragus and antitragus modify extremely the conchial fossa, and when these are combined, as is not infrequently the case, with rudimentary development of the helix, the ear presents a strikingly abnormal appearance. Small fibro-cartilaginous tumours are sometimes present in front of the tragus, which are called "supernumerary ears," and which are undoubtedly the result of disordered development affecting the branchial arches of the cervical region.

The Eye.—The eyelids may be deformed by being either adherent at the angles to one another, or adherent to the eyeball at certain points. The free borders of the eyelids may be either everted or inverted. A more frequent anomaly is the presence of a cutaneous fold over the inner canthus, which occludes the internal angle and gives to the face a mongolian appearance, which is common in certain types of idiots. The upper eyelid may be so short as to leave exposed a part of the sclerotic above the cornea, or there may exist an incoordination of movement between the lowering of the upper eyelid and the movement of the eyeball, which has the same effect. The eyeballs may be exaggerated in size, or diminished in size, or asymmetrical. In the cornea astigmatism is by far the most common sign of degeneration. The iris presents numerous anomalies, among which may be mentioned imperforation, congenital division (coloboma), asymmetry of size of pupils, asymmetry of coloration and irregular pigmentation. Strabismus of all kinds is very common in neuropathic families.

Gastro-intestinal system.—The orifice of the mouth may be too large or too small. The lips may be too short, hypertrophied or abnormally everted. Harelip is a common stigma, and is associated frequently with cleavage of the hard and soft palates. The teeth are subject to various anomalies in the degenerate; most commonly the permanent teeth decay early, and in idiots they are never healthy. The second dentition may not occur at all. In other cases, owing to malformation of the jaws, the teeth, while being of the proper number, are arranged in each jaw in two parallel rows, or are much crowded together, or the direction of their growth may be very irregular. The tongue may be too large for the mouth, as in some idiots, or abnormally small, both conditions giving rise to imperfect articulation. The tongue may also be asymmetrical, and in some cases of cleft palate it has been known to be bifurcated. The papillæ of the tongue are often enlarged, red, and prominent. The degenerate are liable to chronic sub-inflammatory affections of the mucous membranes of the gastro-intestinal tract, and all the organs concerned in digestion are particularly liable to disordered function, and to anomalies of formation. Inguinal hernia is a very general symptom among the degenerate, and is due to a feeble development of the abdominal walls. Imperforate anus and prolapse of the anus are common in children of a neuropathic constitution.

Genito-urinary system.—In man the most frequent anomaly of this system is defective development of the generative organs, although exaggeration in size of the penis and testicles apart from habits of masturbation is not uncommon. Asymmetry of the testicles, monorchidism, cryptorchidism and hermaphrodism occur. Hypospadias, epispadius, absence of the prepuce and congenital phymosis may be mentioned as definite sexual stigmata in the male.

In the female the development of the labia may simulate the appearance of a scrotum, and the clitoris may be exaggerated into a resemblance to the penis. Further, the uterus may be bicornate, the vagina double or the vulva imperforate. The mammæ may be hypertrophied in the male or atrophied in the female.

Accompanying various congenital developmental anomalies in the genital organs of the sexes, we sometimes find changes of a physiological constitutional nature. The constitutional changes that follow castration in man and in domestic animals, and of the removal or disease of the ovaries in women, manifest an approach to the characters of the opposite sex. Masculinism is a condition found in certain women, but not necessarily accompanied by any apparent change in the external genital organs, although it occurs in some cases after removal of the ovaries and after the menopause. The voice is strong, the features pronounced, the skin coarse, and there is a tendency to the growth of beard on the face. The mammary glands are rudimentary, the cranial and pelvic diameters correspond more to the male type than to the female, and the mental attitude and tastes are more in conformity with those of men than of women. Femininism, on the other hand, is a condition found among certain men, where, in spite of the presence of male sexual organs, generally poorly developed, the mental attitude, tastes, and conduct, are those of a woman. The pelvis is large, the hips prominent, the mammary glands well developed, the skin fine, the voice high pitched and feminine, the beard absent or scanty, and the sexual instincts absent or perverted. An intermediate class, described by Féré [1] as androgynous, combines the accessory characters of the two sexes. These individuals are not complete hermaphrodites, but the androgynous individual, male or female, is characterised by an irregular conformity and correspondence between the pelvis the hips, the mammæ, the hair distribution, and the sexual organs. Thus, the male may have a large pelvis with slightly developed breasts and absence of the beard. The female, on the other hand, may have a narrow pelvis, with hair on the upper lip. All androgynous persons have, according to Féré, proportionally large shoulders.

Infantilism is a condition determined by a slow or arrested development of those accessory organs which regulate the fundamental characters of sex, in which the subjects partly conserve until adult state, in spite of their size, the external characters and traits of infancy. In the female the uterus,

[1] Féré, *loc. cit.* p. 299.

ovaries, mammæ, and hair on the pelvis, are undeveloped, and in the male corresponding non-development of the genital organs is present. In both sexes the nails are small, and the second dentition slow, while there is a tendency to stoutness with puerility of the voice.

Cutaneous System.—The skin of the degenerate is subject to various pigmentary changes of an extensive and often symmetrical character. Nævi are common on various parts of the body, especially the face. The skin often presents an unhealthy, mottled appearance, which, however, is due in many cases to irregularity in the capillary circulation. The sweat may be irregularly excreted over patches of the skin, especially on the hands and feet, and not unfrequently its odour is offensive. The development of the hair is subject to great variation. In men, it may be absent on the face and chest, while in women it may be abnormally developed in these regions. It may be irregularly coloured, patches of gray being congenitally present on the scalp, or it may be completely wanting in pigment, as in extreme albinoism. The hair may be abnormally developed over the whole body, or present in abundance in certain parts, such as the lumbar regions and lower limbs. The latter disposition of hair in contrast to its scarcity on the upper parts of the body is frequent in the neuropathic and in those predisposed to phthisis.[1]

In the circulatory system the chief change observed in the degenerate is a weakness and irregularity in the vasomotor mechanism, which manifests itself chiefly by flushings, coldness of the hands and feet, and stasis of the capillary circulation in the extremities, which may extend to local ischæmia, as seen in the symptoms of Raynaud's disease. Many abnormalities in the formation of the heart and large blood vessels, as well as in the disposition, origin, and course of the arteries and veins are probably also stigmata of degeneration, although the examination and proof of this statement lie outside the scope of the present work.

B. *Mental Stigmata of Degeneration.*—Arrested or unequal cerebral development, disharmony of the mental faculties, instability of mental states, of conduct, and of purpose, and a

[1] Féré, *loc. cit.* p. 307.

tendency to dissociated independent action of the ideational centres, are among the principal psychical stigmata of the degenerate.

Defects of the intelligence.—In the lower class of the degenerate, which includes congenital idiots, imbeciles, and other forms of extreme mental debility, the intellectual defect varies from a condition in which there is an arrest of all mental development, as in the forms of complete idiocy, where existence is almost purely vegetative, up to one in which there is limited intelligence with defective moral and emotional sensibility. In all this group it is the lowering of the intellectual capacity which is the most prominent feature; and this, notwithstanding the occasional examples of surprisingly isolated development of the intelligence in certain directions of some idiots and imbeciles. On the whole, however, the interference with the intellectual faculties is a general one, involving all the more complicated mental processes. On the one hand we have a condition such as is found in ordinary idiocy, in which impressions received through the senses form few new ideas, and those of a superficial and fleeting character. On account of the impossibility of forming abstract ideas the mental life remains egoistic, simple, animal. There is a failure to associate ideas, conditioned, probably, by the rudimentary form of the neurons, which are abnormally shaped and deficient in processes. Wherefore idiots have neither the faculty of attention, of judgment, of concentration, nor of abstract memory. Above all, they lack the great and distinguishing human faculty of initiation. In the somewhat less grave condition of imbecility, the intellectual defects, though less apparent, are prohibitive of the individual taking his ordinary place in society. The subjects lack spontaneity and initiative; they are indolent, slovenly, and wanting in energy; they are capable of education up to a certain point, and can be taught to read, write, and count simple sums, while many of them are capable of benefiting to a certain degree from musical instruction; they can also be taught manual labour and some of the simpler trades; but after all has been said, their work is poor, their interest in it mechanical, and it is conspicuously devoid of originality.

On the other hand, there is a class of persons who are apparently of fair intelligence, yet in whom the association of ideas is imperfect, whose judgment is faulty, and who require time to decide upon matters which, to ordinary persons, are intuitively clear at first sight. In conversation, in which rapidity of association and quick repartee are necessary, their insufficiency and incapability is generally apparent. Their memory may be good, even brilliant at times, in certain directions; but it depends upon an internal rather than on an external and essential association, and is, therefore, more encyclopædic than practically useful. Underlying their external appearance of mental solidity there exists a superficiality and weakness of mental action which sooner or later reveals itself to others. Such persons are naturally credulous and easily imposed upon; their will is weak and generally swayed by that of other people; and their reasoning power is exceedingly unreliable, even in matters which intimately concern their own welfare.

Besides intellectual deficiency, we must also notice the cases in whom there is average or exceptional intellectual power. In doing so, the controversy still raging around the question of the neuropathic origin of genius must be referred to. Moreau de Tours and Lombroso are the leading advocates of the position, which, reduced to its barest statement, may be expressed in the words, "no degeneration, no genius!"[1] Both regard genius as a neurosis, and both assert that all men of genius to whom we can point as such, and of whom we know anything, were either degenerates themselves or the descendants of degenerate ancestors, or left behind them a degenerate progeny. When one reads over Lombroso's list of eminent men, regarding each of whom something implying the presence of degeneracy can be predicated, the number of instances given carries with it a form of conviction. Yet it is hard to believe that genius is always a pathological condition, and that all that is worth treasuring in the world, all our progress, civilisation, and art is, by a form of grotesque irony, the result of a diseased deviation from the normal type. Such a belief lands us in a paradox utterly bewildering to our ordinary

[1] See Chap. II. p. 25.

ideas on such matters. We cannot, however, blink the facts as they have been presented to us, and we must admit that the majority of the men of genius whose history has been transmitted to us more or less carefully, more or less correctly, were abnormal—certainly more so than an equal number of ordinary unheard-of men, chosen at random, would prove to have been. That genius is very often of neuropathic origin may, therefore, be conceded: that all geniuses are degenerates is a belief which it goes against the grain to subscribe to, and one upon which, until the subject has been more thoroughly investigated, it were well to reserve judgment.

At the same time, it has to be recorded as an incontrovertible fact that exceptionally developed intelligence is a not unfrequent concomitant of degeneration, both physical and mental. It requires, however, to be carefully noted that this superior intelligence is marred in its manifestations by co-existing defects in some of the mental faculties of the individual who displays it. Often, also, there are gaps (*lacunes* of the French writers) in the harmonious expression of that very intellectual pre-eminence which distinguishes the subject. "From infancy," says J. Falret,[1] "some of these individuals manifest a very unequal development of the intellectual faculties, which are feeble on the whole, yet with remarkable special aptitudes. Many of them, for instance, exhibit exceptional mathematical, artistic, mechanical, or literary powers, or a marvellous memory for details or historical events; while side by side with these mental faculties may be observed huge intellectual gaps and an amazing general mental weakness." Among other examples he cites the case of Pascal to illustrate his remarks. "Than Pascal, there has, perhaps, never been a greater genius or a more miserable one. A geometrician and physicist of the first rank. . . . During his sleepless nights he jotted down on scraps of paper those notes which, after his death, were collected and published as *An Apology for the Christian Religion*. Rejected by the Catholic Church, this book has been the delight of sceptics and freethinkers for 200 years. This great man was a confirmed invalid and the subject of constant hallucinations; a recluse who suspected the

[1] J. Falret, *Annales Méd. Psych.* 1866.

most disinterested acts of kindness on the part of others, who lived literally in filth, and refused to allow his room to be swept or dusted."

Emotional and Moral Defects. — Like the intellectual anomalies, the manifestations of the moral sense vary from its complete absence to its abnormal development, constituting mental hypersensitiveness; while between the two extremes every variety of perversion exists. Moral depravity in the degenerate naturally presents itself under every possible form. When there is complete absence of the moral sense we find the subjects committing acts of the most pronounced and absurd immorality while in complete possession of their reasoning and intellectual faculties. Such persons appear to be quite incapable of understanding why certain actions are in themselves wrong, or of appreciating the attitude of other people in disapproving of or abstaining from similar courses. A not uncommon symptom of lack of moral conscience is an early inclination for torturing animals, which is regarded as an amusement, and its prohibition as an arbitrary hardship. Cruelty in such people persists throughout life, and although they may learn intellectually that it is inexpedient to practise it in its grosser forms, they have no proper conception of it as an evil in itself. They are always indifferent to the feelings and trials of other people, so long as these do not directly affect themselves. In short, such people are morally and emotionally anæsthetic.

Moral perversions without total loss of the moral conscience, and without any emotional deficiency, often indeed with emotional hypersensitiveness, are very numerous. The most typical of such perversions are tendencies to crimes against society, such as theft, forgery, embezzlement, shady dealing, and so-called sharp practices in trade: to crimes against the person, such as calumniation, libel, the writing of anonymous letters, violence in language, assault, continued vindictiveness, and sexual assaults; to personal misdemeanours, such as debauchery, constitutional lying, slothfulness, carelessness, etc.

Moral and emotional hypersensitiveness is a no less common stigma. The subjects exhibit a remarkable mobility

of sensation—an extraordinary susceptibility of the nervous system to impressions of all kinds. Ordinarily they are said to be "sensitive." They have been described by Morel under the name *les emotifs*. The most insignificant causes agitate them; they are, therefore, never completely masters of themselves, and although their intellectual faculties are usually intact, they appear incapable of resisting the temptation of expressing their sorrows and wrongs in language of a highly exaggerated and absurd nature. Such persons are morally hyperæsthetic. They are frequently carried away by their feelings into the development of charitable and protective schemes of the most utopian character; but their use in the social economy is nevertheless of the first importance, and they are, as a class, instrumental in the performance of much good. The more extreme types are, however, sufferers who are handicapped in the struggle for existence, and who frequently succumb to one or other of the functional nervous affections as a result of overstrain and worry.

The Episodic Mental Syndromes of the Degenerate.—The degenerate as a class are subject to various mental aberrations called by Magnan "episodic syndromes," because they are manifested only occasionally, not continuously, but are yet essentially, though not necessarily, confined to the hereditarily degenerate. Chief among these stigmata are (1) obsessions, including imperative ideas, word and number obsessions; (2) obsessing fears, including the various "phobias," agaraphobia (fear of open spaces), claustraphobia (fear of closed spaces), fear of dirt, fear of infection, etc., etc.; (3) indecisions (*folie du doute*), aboulia or pathological want of will power; (4) impulses, including dipsomania, kleptomania, suicidal and homicidal impulses, pyromania, or the impulse to set things on fire, etc., etc.; (5) various perversions, including chiefly sexual perversion, homosexuality, bestiality, erotomania, nymphomania, and sexual fetichisms of various kinds; (6) insanity of various kinds must undoubtedly be regarded as a stigma of degeneration; for as has already been remarked, insanity is not accidental; it can only arise on a prepared soil, and its presence is a sign that the individual who suffers from it is predisposed in a special manner. Magnan, however, distinguishes two forms of insanity, viz.—

an insanity in the *highly* degenerate called "the insanity of the degenerate," and an insanity in the *slightly* degenerate called "the insanity of the non-degenerate." The terms are unfortunate, but the clinical distinction is clear and unambiguous. The distinction will be entered into at greater length hereafter; it is sufficient to state here that the insanity of the "degenerate" is like the sanity of the same class, apt to be irregular in its manifestations, fitful, changeable, and sudden in its origin, course, and termination. It tends to occur earlier in life than that of the "non-degenerate," being frequent before and after puberty, and especially during the adolescent period. It is coloured by the mental weakness of the patient; the excitement is violent, but the exaltation is weakly and foolishly expressed; the depression may be profound, but all delusions are unreal, badly systematised, wanting in depth and force, unconvincing and fantastic. Finally, this insanity is multiform and often cumulative in its manifestations, not infrequently being to true insanity what hysterical paralysis is to organic nerve lesions.

CHAPTER VIII

PATHOLOGICAL SYMPTOMATOLOGY—*continued*

II.—Cerebral Dissociation

We have seen that the nervous system is built up of a series of functionally independent elements, which in health are in a state of mutual equilibrium, and that these neurons are again combined for functional purposes into associated groups corresponding to the higher and more complicated processes which characterise mental life. Any disturbance of the equilibrium of these groups is necessarily followed by disordered nervous action, which we recognise as being the result of functional or organic disease of the nerve elements. A group of nerve elements may be pathologically affected in one of two ways. Its permeability to impressions may be either diminished or increased; in other words and more correctly, its "resistance" may be heightened or lowered. We shall consider these two affections separately, as they are of the first importance for a correct understanding of pathological nervous phenomena.

Increased resistance of nerve elements.—When a nerve is severed or degenerated, it ceases to conduct impressions. Now, a nerve fibril is but the terminal process of a neuron, so that the neuron from which the severed fibril proceeds is functionally inactive and completely resistive. Injuries to the neuron itself destroy its excitability, and thus increase its resistance. While the nucleus remains intact, the resistance of the cell is never complete, but when the nucleus degenerates, the neuron drops out of its group, leaving a gap, so that there is complete resistance throughout the whole chain of neurons for those

stimuli which formerly passed through it, for they cannot bridge the space left by the decayed neuron. In time new associations may be formed answering the same purpose, but the old associations can never be re-established. Therefore organic lesion of a neuron renders it, according to the nature and extent of the lesion, resistive to stimuli. Not only so, but neurons in physiological continuity with it suffer from the want of normal stimulation, their excitability diminishes, and they ultimately degenerate.

But apart from organic affection of the nerve elements, we have to consider what in mental disease at any rate is a more important fact—the functional lowering of the excitability of the neuron. There are several well-known agencies that depress or lower the activity of the neuron. Chief among these are exhaustion, physical or mental, toxins, depressing emotions and traumata. The influence of fatigue upon nerve cells has been described by Hodge,[1] Sadovski, Madame Ternowski, and Sir J. Batty Tuke.[2] They correspond to the first stage of chromatolysis, with diminution of the chromatophile elements, shrinking of the cell and diffuse staining of all its contents. If sufficient rest, sleep, and nourishment are allowed, the cell recuperates, and its normal condition becomes re-established in a few hours; if, on the other hand, recuperation for any reason does not take place, organic degeneration of the elements proceeds until the nucleus becomes affected and repair becomes impossible. In general bodily exhaustion, the nervous system suffers unequally. The higher centres, which are concerned in the mechanism of conscious attention, are always and early implicated, the sensory and motor centres later, and with different manifestations in different individuals. On the whole, the elements of the nervous system manifest high resistance to the free passage of stimuli; in other words, they become depressed and sluggish in their reactions, and their total state is reflected in a general mental and physical depression. Various poisons depress the activity of the nerve centres and increase their resistance. It is to be borne in mind that toxic depressants act upon different parts of the

[1] Hodge, *Journ. of Morphol.* Boston, U.S.A., vol. vii.

[2] Tuke, *The Insanity of Over-exertion of the Brain*, 1894.

nervous system, some affecting the sensory centres primarily, as anodynes, hypnotics, and anæsthetics; others affect the motor mechanism, as curare; while some affect the cord principally, others the brain, and others the sympathetic ganglia. Again, a toxin which in small doses is an excitant becomes in larger doses a depressant, as may be observed in the effects of alcohol. Emotions of a depressing nature have a distinct influence in lowering the excitability and raising the resistance of the cerebral neurons. Finally, traumatic injury, direct or indirect, has a powerfully depressing effect upon the nervous system, destroying consciousness temporarily, and by completely disturbing association, causing permanent forgetfulness, not only of the injury itself, but of events occurring immediately before it. These results are undoubtedly due to dynamic processes overthrowing the neuron association paths, with special effect upon the more recent and more unstable associations.

Mental depression or cerebral instability may follow trauma, but the following case of Goldscheider's proves that where the trauma is limited in extent, and does not affect the whole cerebrum, and even although marked lowering of the sensibility may occur on the affected side, it is not followed by mental depression.

The case was that of a workman, who had received a strong electric shock from a dynamo on the left side of the face. He became immediately unconscious, and was taken to the hospital. The left side of the head and face was much burnt. It was noticed on examining him the day after his accident that on the whole left side of the body the muscular sense was reduced. The sense of smell was also reduced on the left side, and the left side of the visual field concentrically narrowed. There were no psychic alterations, not a trace of distress of mind. Even the idea that the body must have sustained considerable injury was not present. The patient, wishing very much to begin work again, and being better, though with some remnants of the disturbance, was allowed out after a week. His chief anxiety was to make as little of the affair as possible, and on the occasion of a later admission into the hospital on account of a tapeworm, he made no reference to his accident.

The interesting point of this case is that the lowering of the sensory activity was unobserved by the patient, and was not followed by mental depression.

In order to understand the processes involved in states of general mental depression, we must consider the subject from another point of view, and with special reference to conscious ideation. We know that a powerfully depressing emotion can produce in healthy persons a temporary state of melancholy, which resembles in all respects the appearance of pathological melancholia. The latter, however, is idiopathic, more or less prolonged, and independent of external conditions. There must, however, be a physical basis, and that most probably commences in a lowering of the activity and an increase of the resistance of those groups of neurons which form the ideation centres of Flechsig. The resistance of these centres to stimuli (consequent upon a lowering of the activity of their neurons), and their diminished reaction, would immediately lead to painful emotion, because, as we have seen, pain is a concomitant of lowered physiological activity. Now, one painful emotion, granting the continuance of the cause, inevitably leads to the production of another, and to the association of like emotional ideas, which enter consciousness in accordance with laws with which we are already familiar. But the resistive higher centres react of necessity upon the lower sensory and motor centres with which they are in the most intimate anatomical connection, by inhibiting their functions and producing general hypoæsthesia and hypokinesia. This partial inhibition of lower centres does in its turn undoubtedly react painfully and injuriously upon the whole condition. There are, as we shall see further on when considering melancholia, certain cardinal symptoms of that affection which are all explainable upon the hypothesis just laid down. These are mental pain, slow reaction to stimuli, slow muscular reaction, and diminished general sensibility. It is by no means necessary to suppose that all the neurons of all the centres named are permanently or equally affected, nor that all of the ideation centres themselves are primarily involved. So intimate is the anatomical and physiological connection between neuron and neuron, and between centre

and centre, that one cannot be affected without in some way influencing others. We know that in hysteria a patch of local anæsthesia, say on a limb, tends to become general and involve the whole of that side of the body; so in mental states does the local depression of a centre tend to irradiate itself towards other correlated centres.

The ideational centres are always implicated in true melancholia, either partially or wholly, either lightly or gravely, and upon their affection the symptoms of the disease depend. According to the foregoing theory, mental depression results primarily from an affection of the neurons of the high or ideational centres, which are intimately associated with the process of conscious attention, and whose function extends to an inhibitory and regulative action upon the lower (sensory and motor) centres. The lesion produces a state of painful emotion, which becomes fixed in consciousness, and which secondarily causes consciousness to become occupied with painful ideas, solely in accordance with the laws of association. At the same time the whole mental processes suffer by inhibition of free nervous discharge, and through the heightened resistance of the neurons of the higher centres.

Diminished resistance of the nerve elements represents a diametrically opposite condition to the foregoing. Just as certain poisons and other agencies can lower the activity and heighten the resistance of the neurons, so other poisons and agents can heighten their activity and lower their resistance. It is well known that strychnine has the power over the whole nervous system, but especially over the region of the cord, of causing such a lowered resistance of the neurons that under its influence the slightest irritation is sufficient to throw the whole body into general and severe convulsion. Examples of limited hyperæsthesia are constantly evident in all forms of local pain, where the excessive irritation of a peripheral nerve causes a corresponding increase of activity in a group of sensory cells, or where, as in idiopathic neuralgia, a group of central neurons become hyperæsthetic. In hysteria local hyperæsthesias are very common; but in that affection the hyperæsthetic areas tend to irradiate until the whole of one side of the body is involved. Neurasthenia is another affection which offers the

most varied forms of limited and general hyperæsthesias, while in melancholia, the essential feature of which is a lowered activity of the nerve cells, local neuralgias, especially intercostal, are by no means uncommon.

Neurasthenia affords one of the most instructive types of an affection characterised by lowered resistance of the neurons and a tendency to dissociated over-functionating of limited neuron groups. The hyperæsthesias force themselves upon consciousness, and the reacting effect of fixing the attention upon hyperæsthetic areas is an increase in their sensitiveness. In addition, the effect of concentrated attention is to form ideation trains of a like emotional tone, which weaken the mental constitution, if persistent, by dissociating important portions of it for the consideration of useless subjective phenomena. In this way a vicious circle is formed which, unless interfered with or inhibited by more powerful mental processes, may become chronic or hysterical or hypochondriacal. In the dark and when the mind is otherwise unoccupied, these sensations rise into consciousness most powerfully, which is one of the reasons that the patients suffer so much from sleeplessness.

The process is different in that form of mind disturbance which we know as mania. Here also there is very marked lowering of the resistance of the cortical neurons, beginning in the higher (ideational) centres. In the acute forms hyperæsthesias and hyperkineses are exaggerated. Abnormally rapid association of ideas, very acute sensory perception, the sensory images being so rapidly perceived and associated that perception and ideation become confused, and great motor restlessness are among the principal features. All these symptoms point to heightened activity and lowered resistance of the neuron groups. In mania intellectual excitement is the prominent and primary symptom, and it is most probable that in the ordinary idiopathic cases, just as in melancholia, disturbance of the neurons in the ideational centres is the commencing functional lesion. If that be granted, it follows that the lower centres, freed from the inhibition of the higher, whose neurons have become practically non-resistive, pour their stimuli unrestrainedly into the ideation centres, and

participate in the general riot of heightened activity and lowered resistance.

The applicability of the above explanation of the mechanism of the production of idiopathic melancholia and mania finds confirmation in the phenomena of the mental affection known as *Folie Circulaire,* where attacks of melancholia and of mania succeed each other without intermission. Either affection may commence the cycle. After a definite period it fades into the opposite condition, and a period of sanity of more or less definite length succeeds, followed by a return of the cycle in the same order. A similar alternation of mania and melancholia, but without marked periodicity, is often met with in adolescent insanity, and many cases of mania are known to commence with symptoms of melancholia. In such states we perceive a morbid vital rebound of the cortical cell elements from a condition of hyperæsthesia and hyperkinesis to one of hypokinesis and hypoæsthesia, or *vice versâ,* in which it is most probable that the change depends upon a dynamic state of the ideational centre neurons conditioned by a hereditary degenerate predisposition. In mental exaltation the implication of consciousness is more extensive and more profound than in mental depression. The lowered resistance and consequent heightened activity of the neurons of the higher centres, which are concerned in the process of conscious attention, are so pronounced that attention cannot be fixed for any given time upon any one idea or sensation or group of ideas. Consequently the lower centres, freed from inhibition, become hyperæsthetic and hyperkinetic. The absence of the feeling of normal fatigue after great and prolonged exertion, which is so remarkable a feature of acute mania, is entirely owing to the fact that conscious attention, which is alone capable of feeling exhaustion, is in this state in abeyance. The unconscious mind does not become tired.

Mental Confusion.—The more general terms of hyperactivity and lowered activity are not applicable to this condition, which partakes neither of the one nor of the other, but more correctly of both combined. Confusion, no doubt, exists to a certain extent in all forms of mental affection, but there exists a definite group of diseases, all of toxic origin, which

cannot truly be classified under mania or melancholia. Most of them are acute in their course, accompanied by hallucinations of the special senses, fleeting delusions, obfuscation of thought, and a mixture of states of mental exaltation and depression, sometimes the one preponderating, sometimes the other, and often varying in the course of the same case. They are found most typically in the delirium of fever, in post-febrile and post-surgical cases, in acute alcoholism, in septicæmic poisoning, most frequently in toxic puerperalism, in various forms of auto-intoxication, in general paralysis, and in acute delirious mania. Besides the mental symptoms there are present well-marked physical symptoms, such as prostration, increased temperature in all cases, and in other groups various additional symptoms, such as muscular tremor, paresis, paralysis, or convulsions, which all point to widespread implication of the neurons of the brain cortex, or of the whole nervous system. Here, then, we are dealing, not with a group of affections depending primarily upon implication of the intellectual centres, where conscious ideation alone is prominently affected, but with the simultaneous effects of toxins upon widespread areas irrespective of their hierarchical position. Toxins show, as has already been mentioned, a special affinity for certain areas of nervous matter, and in these instances this law is respected, for microscopical examination clearly shows that some regions suffer more severely than others, and that some escape altogether. Again, a toxin may act with different intensity, and therefore with different results, upon different neuron groups. Alcohol is a specially good example of the power of a poison to select certain physiological neuron groups for attack, and, according to its relative quantity, to depress or excite the cell elements. Therefore, we can easily argue that a toxin present in the blood can affect different groups of neurons unequally, so that while the reaction of one group is hyperactive with lowered tension, the reaction of another group is diminished and its resistance markedly increased. In normal conditions excessive functionating of one group of neurons is physiologically interfered with by the inhibiting influence of opposing nerve currents, but where this, owing to the irregular pathological

nature of the process, is impossible, there results confusion of thought, disturbance or loss of the idea of personality, uncertain and impulsive action, and many other anomalies depending upon the intensity of the poisoning of the cortical cells, and the area of the elements involved.

Hypochondria.—This affection is closely allied to, indeed dependent upon, a condition of neurasthenia, which is in turn a stigma of degeneration or of hereditary weakness of the nervous system. Most cases of hereditary neurasthenia, which as a rule resist treatment, become chronic and end in confirmed hypochondria. It has also close affinities with hysteria, which also depends upon instability of the nervous system, the result of hereditary neurasthenia. Between melancholia and hypochondria there is to be found every stage of transition, and the two affections in certain cases merge into one another so indistinguishably, that a hypochondriacal form of melancholia is described by many writers. A little observation, however, makes it manifest that the two affections are different in so far as the emotional depression, combined with the intellectual disturbance of melancholia, is not present in hypochondria. In the latter the implication of the ideational centres and the emotional depression are secondary and dependent upon hyperæsthesias located in groups of cells in the sensory centres, especially in those centres concerned with the reception of visceral, cutaneous, and muscular sensation. That those hyperæsthesias are intimately associated with nutritive changes and disorders is possible, nay highly probable. But there can be no doubt that as they force themselves upon consciousness and are brought within the focus of attention, they increase enormously, and they create for themselves partial trains of dissociated ideation of a depressive emotional tone, which rivet attention and distract the harmonious and normal working of thought. Hence arise mental weakness, concentrated subjective observation, and the neglect of object consciousness, which is so essential for healthy mental life. As the lesion is not primarily intellectual, there never occurs that complete and overwhelming depression and disorder of reason which are so prominent features of ordinary melancholia. The patient has fixed and irremovable ideas certainly, but it is with a conscious effort that he mani-

fests general emotional depression and complete self-occupation. He furtively looks for the sympathy which his weakened mind craves, whereas the true melancholic is too downcast to care whether sympathy is offered or not. This distinction is important, especially in view of the remarks which follow upon other affections of the mind depending upon cerebral dissociation.

Obsessions.—An obsession is a dissociated group of ideas which suddenly enter consciousness, disturbing the ordinary course of ideation, but not involving the personality of the individual. Obsession is to ordinary thought what impulse is to normal action. That is to say, obsession is dissociated thought. How can a train of ideas become dissociated? Only so far as we can understand it, by a group of neurons in the ideational centres becoming hyperæsthetic, or hypoæsthetic, or in other words, by their becoming abnormally resistive or abnormally excitable. When a persistent peripheral stimulus acts upon lower centres,—as for example when an enlarged and irritable prostate affects the lumbar cord centres and reflexly the cerebrum—a corresponding neuron group in the cortex may become hyperactive and a sexual obsession may force itself into consciousness. An increased resistance in a group of neurons might, on the other hand, disturb the normal association of ideas by permitting certain subconscious ideational currents to enter consciousness without being either properly inhibited or modified by ordinary conscious thought. We can understand how a latent idea in the subconscious mind may thus force itself into consciousness, carrying with it its own emotional tone, which tends to deepen by association with other ideas, and its latent intensity, which increases by repetition. Its persistent demand on conscious attention may also be regarded as a secondary form of acquired emotion. The intensity of conscious ideas resulting from abnormal or imperfect association depends (1) upon the intensity of the currents that cause it; (2) upon the emotional tone and quality of the ideas with which it becomes associated; and (3) upon the intensity of the peripheral sensations, if any, which originate it. It is only necessary to refer to the first condition, for the others are self-evident. If a comparatively large or im-

portant group of neurons becomes for any reason highly resistive to the nerve currents which are constantly streaming through the cortex, the discharge of these currents formerly modified by such a neuron group must take place with more limited, consequently with greater, force through other channels. Therefore the intensity of the forced association depends upon the extent and intensity of the resistance of the affected neurons. Again, the habitual association in certain directions lowers gradually the resistance of the newer paths, increases their excitability to the same discharge, and facilitates the entrance of the corresponding ideas into consciousness. That the above is probably the correct explanation of obsessions is borne out by the following facts of clinical observation. (1) Obsessions are most common in neurasthenics, hysterics, and in all degenerates, among whom, as a class, other forms of cerebral dissociation, disequilibrium, and weakness of nerve elements are generally found. (2) Obsessions may be independent of preceding emotions or any other known determining cause. (3) Obsessions abruptly enter consciousness, often with startling suddenness disturbing ordinary thought, and remain there altogether outside of the influence of the conscious mind. (4) They are recognised by the subject as being foreign to his personality and his modes of thought, and are not, at any rate in most cases, blended with his individuality. (5) Their haphazard origin is apparent from the fact of their immense variety, there being as many forms of obsession as there are of thought. Some are harmless and meaningless, as for instance the desire to repeat certain words or phrases, to count objects of no interest, or to touch some article of furniture. Others are fateful to the individual and dangerous to other people, as the desire to kill, to commit suicide, or to steal. The fact that obsessions may sometimes follow hereditary lines or be the result of proclivities unfortunately acquired, in no way affects the truth of what has just been said, or the explanation given above; for most often obsessions are unprecedented in the experience of the individual, unrelated to any remembered previous trains of thought, and entirely foreign to his personality.

Impulse is a morbid action or series of actions performed

consciously by an individual apart from, and in spite of, the intervention of the will power. All our actions are the result of previous thought, whether conscious or unconscious, and in normal states they are usually adapted purposively by the conscious mind to the end in view. As thought leads up to ordinary action, so does obsession lead up to pathological action or impulse. As there are as many thoughts, speaking generally, as there are actions, so there are as many obsessions as there are impulses. It is therefore useless, even if it were possible, to classify and name the various forms of impulse, all of which depend upon preceding obsessions. A few, on account of their legal and medical importance, demand special attention. They will be dealt with at length under the clinical symptoms of the insanity of the degenerate. Among these are the suicidal and homicidal impulses, the impulse to steal (kleptomania) and the impulse to drink (dipsomania). The general character of impulse is important to know and to bear in mind, for upon its recognition depends often a diagnosis which is fraught with the weightiest consequence. There is often preceding mental distress, caused by the strength of the obsession, which demands relief by a discharge into action. Against this discharge there is passively opposed the resistance of the normal brain neurons, and the active purposive resistance of the conscious will, if the action is judged to be detrimental to the individual or to others. There is thus brought about a struggle which may cause the patient much suffering, neural tension, sometimes loss of sleep and of appetite for food, but always distress of some kind. The obsession, if strong enough, generally ends by overcoming the will power and realising itself in action. When the act is committed, there is usually profound satisfaction and a feeling of relief and rest. But if the action is immoral, or shameful, or detrimental to self or others, this feeling of relief is sooner or later followed by one of remorse and self-reproach, with often a great anxiety lest the obsession should again recur.

Delusions.—A delusion is a partially dissociated train of ideation, which invariably involves the personality, which possesses a distinct emotional tone, and the content of which refers to subjects which are either inimical or beneficial to

the welfare of the individual. There are delusional states to which the above definition may not be strictly applicable, but they are only to be met with in persons who are either congenitally weak-minded, or in whom the brain power has been crippled by previous mental or organic disease.

Delusions are of two kinds, fixed and fleeting. The latter are obsessional in their nature, and occur chiefly in acute mental disturbances, whether idiopathic or the result of toxic conditions of the blood. They are usually accompaniments of a general hyperæsthetic state of the cortical neurons, where there is great and inco-ordinate ideational activity—"Ideenflucht" of the German writers. While, therefore, they are important clinical symptoms of certain acute mental affections, their essential character is insignificant compared with the class of fixed ideas, which form by themselves the basis of some of the gravest of all mental diseases. The following remarks refer entirely to fixed delusions.

The phenomenon of delusion must be regarded as the result of dissociated cerebral action of an extensive nature. Our ordinary thought processes are all formed by the association of conscious perceptions and ideas with subconscious or latent ideas. Any interference with this association is destructive of normal thought. Subconscious thought is naturally logical and syllogistic; but when it enters consciousness it is rendered, if one may be permitted the expression, artificially logical by its union with conscious ideation. In other words, it is reviewed and modified by consciousness. When from any cause subconscious trains of ideation are not properly regulated by the inhibitory and discriminative higher faculty, they may rise into consciousness as dominating factors which form free associations and create emotional tones of a distinct character. Emotion is the ultimate result of the association of groups of ideas, and it persists after the ideas which gave it origin have passed away. Emotion of any kind compels conscious attention, and through this means a vicious circle is formed which encourages the stay of the dissociated ideas in consciousness and maintains their emotional tone. Further, powerful emotions weaken judgment by compelling the concentration of consciousness upon themselves and its consequent

withdrawal from other and corrective subjects of thought. In discussing the psychical mechanism of obsession, we concluded that the dissociation of neurons upon which they depended was limited, and that consequently they did not involve the personality, but were looked upon as foreign and isolated ideas, and regarded as abnormal by the subject himself. In the case of delusions, on the other hand, the dissociation is more extensive; for the personality is involved, and their abnormality is not consequently recognised at the time by the individual. It has been conclusively shown beyond dispute that delusions may result from vivid dreams. Dreaming is a typical example of cerebral dissociation. The latent subconscious ideas, freed from the corrective influence of the higher ideational centres, the neurons of which are anæsthetic, rise into the dreamy sleep consciousness, and under unknown conditions are capable of associating with great emotional vividness. The resulting emotion may be so powerful that (in a pathological brain state certainly) the associations remain fixed and enter into the composition of the "ego" ideas.

Delusions invariably refer to the personality of the individual, because they are entirely of subjective origin, and because their component ideas are not correctly regulated by conscious ideation of external origin. They are of two kinds, either expansive and grandiose, or painful and depressing.

When the ideational centre neurons are resistive, the resulting ideation is of a painful or depressed character, and the associated ideas which are attracted from the subconscious mind are of the same tone and content. This is well seen in the state of ordinary exhaustion in otherwise normal persons, when the gloomiest forebodings unrestrainedly enter consciousness and cloud the mental horizon. On the other hand, when the resistance of the neurons of the ideational centres is abnormally lowered, gay and expansive ideas crowd into consciousness, as is exemplified in the earlier effects of alcoholic intoxication. In both instances the ideas are subjective and personal. Let us suppose for a moment that the mental effects of exhaustion or of the earlier stages of drunkenness upon the neurons of the higher centres could be inde-

finitely maintained. The inhibitory and corrective effects of conscious ideation, largely of objective origin, being weakened, subconscious subjective ideas would struggle for predominance in consciousness until finally one intenser, more emotional group of ideas would prevail and dominate the personality to such an extent as to incorporate itself into the "ego" idea, and become unrecognisable as a foreign or morbid phenomenon. The emotional tone of delusions is, therefore, conditioned by the pathological state of the neurons of the ideational centres. Their content is also primarily influenced by the same factor. If a person is unhappy or fearful, the train of ideas which these emotional states attract into association and help to present to consciousness, are such as harmonise with the prevailing feeling, not only in tone, but also in content. If, on the other hand, the person is joyful and expansive, corresponding ideas enter consciousness. As with normal thought, so is it with delusions, with this difference, that in health conscious states of emotion are fluctuating, while in disease they are rigid and fixed to a large extent, and consequently the corresponding ideas are fixed. Now, a constantly recurring group of ideas in virtue of frequent repetition alone acquires a facility for entering consciousness, more especially as it has proved its strong claim for attention by being selected over hosts of cognate ideas. Thus does the dissociated group of ideas forming a delusion ultimately dominate the personality and become a new source of action and general conduct. But in the absence of grave and general cerebral disequilibrium, such as we find in the acute insanities, it seldom happens that a group of ideas, however prominent in consciousness, and welded with the personality, can wholly influence conduct. A man may be the victim of a besetting vice, of an engrossing hobby, of a social panacea, or of a fixed delusion; but unless subjected to very minute and constant observation his conduct will not generally attract the attention of casual acquaintances, nor call for special remark, so long as the mental peculiarity is kept in the background. Unfortunately, however, the delusion has a tendency, if its emotional tone is strong, and if its content refers to subjects of vital interest to the personality, to assume a gradually

increasing influence upon the mental life, until finally, in the majority of cases, the patient's conduct becomes so subordinated to its suggestions that his restraint and isolation are rendered necessary.

It is not uncommonly observed that delusions fade away, though in most cases they are replaced by others of a totally different emotional tone and content, often by delusions of a diametrically opposite kind. In the form of mental affection known as Progressive Systematised Insanity,[1] the painful ideas of persecution which characterise the earlier stages of the affection are gradually supplanted by expansive ideas of a totally opposite content and emotional tone. Also in the systematised insanity of the degenerate we observe the most sudden and startling changes from depressive to expansive delusions; indeed it is known that in some of these cases the two forms of delusion may co-exist in a see-saw relationship to one another, now the one preponderating, now the other.

The change from one emotional delusive state of a given content to another delusive state of an opposite or totally different kind can only be explained in accordance with the theory which has been so often referred to—namely, a change from a state of hypoactivity and increased resistance of the ideational neurons to one of hyperactivity and decreased resistance of the same. The affection of the nervous elements, which permits of dissociated ideation, remains, but it is changed from one pathological phase of activity to another, just as in the parallel condition of *Folie Circulaire*. In the insanity of the degenerate, however, it is necessary to remember that we have to deal with a highly unstable nervous system, where dissociated action of neuron groups, owing to faulty development and a probably altered morphological construction, is almost a rule and not an exception. So in the degenerate we are not surprised when we meet with hysterical, neurasthenic, or dissociated cerebral symptoms of an anomalous kind. Their delusions, like their sane thoughts, are bizarre, erratic, often weak and colourless, always subject to sudden transformation. Even when fixed and continuous, they bear the stamp of the source from which they emanate. It

[1] Magnan's *Délire chronique à évolution systématique*.

requires a good brain to formulate a really effective and interesting systematised insanity. The systematised delusions of an imbecile or of a weak-minded person, or of a degenerate of the higher grade, even of a genius, are always either weak or illogical, extravagant, or wanting in continuity and strength, or, as most generally happens, confused.

Hallucinations.—There is no such thing as a normal hallucination, although presumably normal individuals have frequently experienced them. Even the presumably normal subjects of hallucinations have, in the majority of authentically observed cases, been ascertained to have been mentally or physically exhausted, to have been ill, or to have been in the half-dreamy state between sleeping and waking at the time of the appearance of the hallucination. Hallucination may, then, be defined as a morbid phenomenon, the result of dissociated cerebral action, by means of which a perception that has no objective basis or reality is subjectively perceived by the conscious mind, and projected externally. Hallucinations may be divided into simple or primary and secondary or ideational.

Primary hallucinations are the result of some irritation in a sensory end-organ in the course of the special sense nerves, or in the central cortical termination of the same nerve. Each special sense, according to the law of Müller, reacts similarly to stimuli of different kinds, and the same stimulus produces different reactions in the various sense organs. Thus, electrical stimulation of the eyeballs produces flashes of light; of the ears various sounds; of the tongue taste, sensation; and of the nasal mucous membrane various sensations of smell. It may be that in the two latter examples the sensations are caused by chemical substances formed as the result of electrolysis. In any case, all the above phenomena may be regarded as false sensations, and it may be conceded that in certain pathological conditions of the brain such peripherally conditioned sensations may originate false perceptions or hallucinations. Hallucinations of hearing have been known to occur in cases of middle ear disease, and even as the result of closing of the external meatus by excessive secretion of wax. It is probably also the case that toxic conditions of the blood act directly upon the sensory tracts and cortical centres,

causing changes in their neurons, which directly lead to the production of hallucinations. It is difficult otherwise to account for the predominance of certain hallucinations in different forms of poisoning—for instance, the almost constant occurrence of uniform kinds of sight hallucinations in acute alcoholism. Liepmann [1] found that by pressing upon the eyeballs of patients recovering from alcoholism he was able at will to reproduce the visual hallucinations, even after they had ceased to exist for some time previously. It will be found that pressure upon the external meatus intensifies certain kinds of auditory hallucinations, and the same is undoubtedly true of electrical stimulation of the ears.

In the simpler primary hallucinations of peripheral origin, the false perceptions are usually recognised as such by the individual, provided they are intermittent and not long continued, and provided there is no accompanying mental disturbance. Even in the insane, especially in the degenerate, we may meet with examples of hallucinations of an obsessional character, which do not involve the personality, probably because they are the result of limited dissociations, which do not correspond with any prevailing mental state. Such is undoubtedly true of the hallucinations of the sane. They are of the nature of perceptional obsessions, the extraordinary and extra-personal character of which is fully recognised by the individual who experiences them. But a perception is always a complex ideational act involving not only the discrimination of an externally arising sensation, but its association with latent subconscious ideas of various kinds.

We have to consider, then, two distinct classes of phenomena: (*a*) peripherally conditioned hallucinations, generally of a simple kind; and (*b*) obsessional, generally more complex hallucinations, neither of which are of ideational origin, neither of which are at first at any rate recognised as real by the individual, and neither of which involve the personality or directly influence conduct. Both kinds of hallucination are the result of forced association. When the stump of an amputated limb is electrically stimulated and the absent fingers and toes are distinctly perceived (tactually), the cause

[1] Liepmann, *Kraepelin's Psychiatric*, p. 98.

can only be that the excessive irritation of the different nerves has forced into association neuron paths long previously disused. In the same way irritation of the cochlear or of the optic nerve, even if not severe, tends by summation of stimuli to arouse latent ideas in their afferent cortical paths by forcing associations that would otherwise remain dormant or only respond to their own specific mode of association, which is everywhere predetermined by heredity and habit.

In the obsessional hallucinations of the over-exhausted or half-sleeping individual the psychical mechanism must be somewhat, though not essentially, different. A brain exhausted through normal fatigue is liable to dissociation of neuron groups, owing to their becoming highly resistive to nerve currents; a brain half asleep is a brain in a semi-general state of dissociation through the same cause. The peripheral or associative nerve currents being reflected and unable to pass, accumulate in neighbouring neuron groups, from which they overflow suddenly, forcing the associations in certain directions and causing a perception of central origin which is externalised, and bears the impress of a real perception. But since the brain is not mentally enfeebled or disturbed, the falsity of the apparition is at once determined by consciousness; yet a hallucination of this kind may gradually weaken judgment by its frequent repetition or persistence, just as an obsession may for the same reason ultimately become a fixed delusion involving the personality.

Secondary hallucinations are of ideational origin, and as such are intimately associated in emotional tone and content with the prevailing mental state of the patient. It is probably the case that a hallucination of primary origin may by its persistence gain such an ascendancy over the personality as to modify the whole mental condition of a patient, and become the starting-point and the central pivot of a systematised insanity; but in the great majority of mental affections the hallucinations are secondary to a conscious or subconscious train of disordered thought. Broadly speaking, an insane man who believes himself the victim of persecution generally develops hallucinations corresponding to his delusions, and an insane man who has delusions of pride and grandeur is liable to correspond-

ing hallucinations. There are exceptions, which will be dealt with under the description of the varieties of delusional insanity.

When the conscious mind is occupied with any idea, the faculty of attention is at the same time concentrated upon all its aspects, and all related ideas readily associate themselves with it. When a normal person is highly expectant, say, of the arrival of a friend, his attention is on the alert for every sound and every indication that might reasonably herald his approach. Or when a normal person is suspicious, each gesture, word, and action emanating from the suspected quarter is doubly vivid. Under such circumstances it is the commonest thing for sane persons to commit egregious mistakes, to labour under illusions and even hallucinations of the senses. But when innervation is morbid, when there is a tendency to cerebral dissociation, when, finally, a group of ideas with strong emotional tone dominates the personality, we can easily perceive how hallucinations may originate. Let us briefly recall the influence of attention upon ideation. The idea is held in focus until every related idea is associated. If its emotional tone is strong, especially if it is morbidly strong, this process of association may proceed until the limit of the primitive ideas upon which it is founded is reached. All ideas, especially those which are closely in relation to sensory perceptions, have a verbal component. Our verbal ideas are principally founded upon the sense of hearing; and the auditory centre is intimately and directly associated with the motor speech centre, which both are again indirectly associated through the ideation centres. When, therefore, a group of ideas of strong emotional tone compels attention upon secondarily associated ideas involving the auditory and speech centres, the motor element of attention stimulates not only the neurons of these centres, but also their external muscular mechanism. In this way the train of dissociated ideation extends itself backwards into the special centres mentioned *in so far only as regards ideas whose content and tone are of such a kind as to permit of this association.* This association of ideas backwards is merely an exaggerated form of normal thought, specially conditioned, however, by the circumstance that it originates in a dissociated mental process, which exercises a

more limited and consequently a more intense activity in reviving cognate latent ideas. Hence a secondary hallucination is the necessary result of a dissociated ideational process, of which it forms the ultimate factor. No doubt its frequent repetition raises it into prominence, not only as a clinical symptom, but also as an apparently isolated phenomenon; but in itself it possesses no independent position, and is in no sense a clinical entity. Secondary hallucinations are, according to the above theory, caused by cerebral dissociation; but their dissociation is only a conjoined part of the greater ideational dissociation, of which it is the consequence. For this reason they affect the personality of the patient; they are regarded as realities; their content or tone is similar to that of the morbid dominating ideas in the mind; and they suggest nothing new or startling, but are drawn from the subconscious latent fund of previous experience. Occasionally such hallucinations are unilateral, a fact which it is difficult to explain, unless on the supposition of a focal or functional lesion of the sensory tract on one side. This may probably account for unilateral hallucinations in some cases; but whether it forms a sufficient general explanation cannot be even guessed at in our present state of knowledge. The extraordinary clinical fact, first brought into notice by Magnan, and since confirmed by other observers, that in some cases of progressive systematised insanity hallucinations in the first stages of the affection are heard only in one ear, and in the later stages, where the insanity of persecution is replaced by an insanity of ambition, the corresponding hallucinations are only heard in the opposite ear, is highly important in the consideration of the mechanism of unilateral hallucinations.

Hallucinations of hearing are by far the most common of all hallucinations in insanity. In acute insanity, especially in melancholia and the toxic insanities, indefinite noises in the ears, such as ringing, rushing sounds and whistlings, are extremely common. Such hallucinations are probably primary, and due to irritations or minor dissociations in the sensory centre itself, the result either of general conditions or of the functional disorder of the ideation centres. In other cases, especially in systematised delusional states and in confirmed

melancholia, distinct voices are heard by the patients. These voices utter words or sentences, or carry on long and sustained conversations, all of which have reference to the welfare or otherwise of the patient. Still another form of hallucination, which may be classified as auditory, is known as "psycho-motor" hallucination. Here the words or voices are not actually externalised, but are intellectually perceived without sound. In other respects the subjective sensation corresponds to an ordinary hallucination of hearing. Such patients often complain that their thoughts are read or understood by their enemies. In this class of case we have undoubtedly to deal with secondary hallucinations of the motor speech centre alone, the mechanism of which is the same as that of secondary hallucinations of the special sensory centres. Seglas[1] has divided psycho-motor hallucinations into three groups. (1) Those in which there is no movement of the organs of speech corresponding to the hallucination; (2) those in which the hallucination is accompanied by movements of articulation, but without pronunciation of the words; and (3) those which are accompanied by complete pronunciation of the words, and which form a veritable verbal impulse.

Hallucinations of sight are particularly characteristic of toxic interference with cerebral action. They are common in all forms of alcoholism, in poisoning by various mineral and vegetable drugs, in exhaustion, starvation, and long-continued thirst. They are unfrequent in ordinary idiopathic insanity, but are sometimes observed in certain cases of epilepsy, hysteria, and allied neuroses. They may occur with great vividness in the blind, but not in persons born blind. The image may be duplicated, according to Dagonet,[2] if the parallel ocular axis is disturbed by pressure on an eyeball. Ball[3] records a case in which in a hemiopic patient only one-half of the fantastic figures were seen.

Hallucinations of taste and smell are comparatively rare. They occur in toxic conditions, especially in acute and chronic alcoholism, also in some cases of epilepsy and in many forms

[1] Seglas, *Des troubles du langage chez les aliénés*, p. 892.
[2] Dagonet, *Traité des Mal. Ment.* 1894.
[3] Ball, *Leçons sur les Mal. Ment.* 1883.

of systematised insanity. In the latter affection they are always secondary to ideas, the result of subjective malaise and discomforts which the patients experience. In acute toxic and idiopathic insanities it is often difficult to distinguish these hallucinations from illusions or primary hallucinations, the result of disordered gastro-intestinal functions and altered secretion of the mucous membranes.

Hallucinations of touch and pain and of the muscular sense are of great importance on account of the exasperating character of the influence which they exercise upon the patients. In hypochondria the hyperæsthetic and hypoæsthetic sensations are often widespread, involving the limbs, the viscera, or the head. They may originate general ideas of weight in the limbs, of lightness and vacuity in the body cavities, and of increased or diminished size of the whole body.

During the fourteenth and fifteenth centuries forms of similar hallucinations became contagious by suggestion over large portions of central Europe. The affection was known as lycanthropia or wolf madness. Large numbers of people imagined themselves converted into canine forms, and scoured the surrounding country barking and behaving like vulpine creatures.

In the persecution stage of systematised insanity hallucinations of touch and of general sensibility often play an important *rôle* in the development and exaggeration of the mental symptoms. The patients believe that they are acted on by their persecutors by means of electricity or magnetism, or that they are touched, pinched, or bruised in various parts of the body by instruments or machines. Such hallucinations are frequently referred to the sexual organs, and in that case constitute some of the most distressing features of the malady. Men complain of attempts at castration and emasculation or other obscure feelings, while females describe themselves as the victims of rape or attempts thereto, or of violent or obscene interferences with the genital regions. Finally, definite hallucinations of touch which take the form of insects creeping over the skin, of burning sensations or of flaying and mutilation are met with in acute toxic states, more especially in alcohol, cocaine, and morphia poisoning.

Illusions.—Strictly speaking, there is no legitimate psychological distinction between an illusion and a hallucination; their mechanism is the same: they are both sensory deceptions, and they are both divisible into primary and secondary conditions. For practical purposes, however, and especially for clinical observation, it is advisable to retain the distinction and to describe illusions as morbid phenomena chiefly dependent upon cerebral dissociation, which possess an external sensory objective reality, but which are subjectively misinterpreted.

All men are subject to illusions of the senses; indeed our whole sensory existence has not inaptly been described as a tissue of illusions, for nothing is what it seems to be. There are some natural physical phenomena which are so constantly experienced and recognised as illusions that their rectification is unnecessary—such, for instance, as the refractory rays from a piece of wood plunged in water, which give it a bent appearance. But there are other illusions less common in experience which the sane mind has by an effort constantly to rectify. The insane mind has not always this power. If the sane mind is in a state of expectancy or unusual suspicion, the power of rectifying illusions of a certain kind is greatly modified. When the insane (dissociated) mind is occupied with certain trains of dominating ideas, illusions corresponding to these ideas are of frequent occurrence. In melancholia the most assuring speeches of friends are apt to be misinterpreted into sinister and cruel avowals; in the systematised insanity of persecution the simplest greeting or noise inadvertently made by another person may be misconstrued by the patient into a threat or an insult; while in acute mania, where the senses are hyperæsthetic, every movement, colour, feature, gesture, or whisper is exaggerated and misapplied by the sufferer.

Esquirol divided illusions into (1) sensory; and (2) ganglionic or visceral. Visceral illusions are well known to be present in predisposed individuals who suffer from acute organic or functional disorder of internal organs, such as the stomach, liver, intestines, or uterus and its appendages. Affections of the female pelvic organs are very often followed

in the mentally unstable by ideas of pregnancy or ideas of an erotic nature. Clouston [1] records the cases of patients refusing food who died of cancerous and other abdominal diseases, and also a similar case in whom there was disease of the sympathetic abdominal ganglia. Leuret gives the case of a woman, a pew-opener in a Paris church, who became the subject of chronic peritonitis, and who explained her painful symptoms as being due to the presence in her abdomen of several bishops holding an ecclesiastical council; the pains were worst when any of the bishops walked or gesticulated.

Changes in the Personality.—To a certain extent it is true that every mental disturbance involves a change in the "ego" ideas. Even unusual events in the lives of people may change the personality, as evidenced by the subsequently altered character and disposition. Our conscious personality varies with every hour of the day, with every thought, action, sensation, and mood. It is only rendered continuous by the constant linking of new ideas and perceptions on to old and latent ideas, so that the stem of our personality is the thread of conscious memory running through our lives, and our immediate sense of personality is that part of the thread, composed of ideas and sensations of various kinds, which is *now* being spun into harmonious coherence by the unconscious mind. Every affection of the conscious mind, whether delusion, hallucination, depression, or exaltation, deflects the normal course of personal identity. During normal sleep, alcoholic or chloroform intoxication, concussion of the brain, delirium of fevers, and many other similar conditions, the sense of personal identity is either lost altogether or profoundly disturbed, or more rarely a double personality coexists, the one normal, the other the result of pathological conditions. All these changes may occur in the various forms or in the different stages of mental affection in proportion as the physical basis of conscious mind is interfered with; and in proportion to the character and extent of that interference is the personal identity altered either by being temporarily disturbed or permanently transformed or almost totally destroyed.

[1] Clouston, *Mental Diseases*, p. 77.

The affection known by the somewhat misleading name of "double consciousness" is a peculiar disturbance of personality which has not yet by any means received the attention and observation to which, as a clinical phenomenon of the very first importance, it is entitled. Its supposed rarity is perhaps not quite so great as is believed, and depends upon its not being always recognised. It may be that several anomalous states of mental disturbance, especially such as are of short duration, are of this nature. The condition is a periodic or at any rate a recurrent one, during which the patient behaves automatically, semi-consciously, and in a quite different manner from his normal state. It is in fact an idiopathic, hypnotic, or somnambulistic state, during which *conscious* memory of former states is generally in abeyance. When the somnambulism passes off, the patient has no recollection of his actions, thoughts, or sensations during the morbid period. It closely resembles post-epileptic automatism, induced hypnosis, or ordinary somnambulism. In some cases, as in one recorded by Tissié, the morbid state was always suggested by a dream, and on awakening from sleep the patient proceeded in the hypnotic state to carry out the suggestion, which in his case was that he should wander through various European countries, which he invariably did. That it is intimately allied to hysteria cannot be doubted; many of the subjects are hysterical, while others are hystero-epileptic. Further, its parallelism with the somnambulistic stage of induced hypnosis is apparent. Some of the cases are partially anæsthetic during the attack, as is seen from the following extract of a case reported by Azam[1]:—"During these crises his instinctive functions and his appetites continued as in the normal state. He ate, drank, smoked, dressed, and undressed himself and went to bed at the usual times. He was completely anæsthetic, and had neither the sense of taste nor of smell, and his sight was imperfect; but the sense of touch was highly developed. The crises vary in duration, are separated by intervals of 15-20 days of normal health, and are without fixed periodicity. I will add that all the acts that F—— performs during his attacks are only repetitions

[1] Tuke's *Dict. of Psychol. Med.* vol. i. p. 402.

of his habits during his waking state, with the exception of one idea that he only has in his second state—the tendency to theft."

From what has been said, it is apparent that we have to do here with a neurosis characterised by the temporary abeyance or dissociation of the conscious mind elements, and the domination of the individual by subliminal conscious states, or by phases of the unconscious mind. Therefore, the term "Double Consciousness" or "Dédoublement de la personalité" of the French does not strictly apply to it, although it is the only one under which the affection has up till the present been described.

PART III

CLINICAL SYMPTOMATOLOGY

CHAPTER IX

IDIOPATHIC MENTAL AFFECTIONS

The forms of mental affection about to be described arise as a general rule without any apparent external cause. They are, properly speaking, neuroses of mind, the majority of which are periodic. The periodicity may not always be apparent, but the occurrence of similar clinical forms with a regular periodicity is sufficient to determine the nature of those cases where periodicity is not apparent. The periodicity in many of the cases is irregular; the intervals between the attacks may extend over many years. It is well known that many cases of epilepsy only manifest one or two fits in a lifetime, yet there is usually no difficulty in the diagnosis of epilepsy. So in a large number of cases of mania or melancholia, while only one or two attacks may appear in a lifetime, the character of the attacks themselves and a careful observation of the after history will remove doubts as to the existence of periodicity. Between the ages of fifteen and twenty-five, and later in life between forty and fifty, the attacks are most numerous. Between the ages of twenty-five and forty they may either originate spontaneously or more commonly follow some powerful internal or external influence which depresses vitality and disturbs the physiological balance in predisposed persons.

When such attacks of mania or melancholia or of circular insanity supervene between the ages of fifteen and twenty-five, they are described by many writers, notably Clouston, as the "insanity of adolescence." It is at the adolescent period especially that the periodicity of these forms is most marked.

Very few cases during that period fail to manifest distinct

periodical recurrence or alternation. This marked periodicity may cease with the termination of the adolescent period, or it may continue throughout life with the same persistence. In typical cases the attacks recur with the same periodicity as is shown in physiological functions, such as sleep and menstruation, or in such morbid conditions as epilepsy. The attacks, even of a case manifesting great irregularity of periodicity, must not be regarded as separate clinical maladies, but as manifestations of an underlying and continuous morbid state of the nervous system, which culminates in the mental storm constituting the attack.

This general and continuous morbidity of the mental state of the affected persons is manifested by many signs to those who live constantly in their society. The periodicity is more apparent to them than to others who only see the patient during the grand crises of the malady. The near relatives often observe changes in disposition, in temper, and in conduct which recur at stated and regular times, and which we are bound to regard as smaller and more trifling exhibitions of the disease, and which bear the same relationship to the graver explosions as "petit mal" does to "grand mal" in epilepsy. But besides these changes in the patient's mental or moral attitude, there are also frequently numerous mental stigmata which characterise such cases. Among the cases which manifest periodic mental attacks early in adolescence the mental and physical stigmata are so numerous that many of them might justly be classed among the degenerate—while in others the stigmata are exceedingly meagre.

It may, however, be stated generally of such cases that in the intervals between their attacks they are morbidly sensitive to various external influences and irritations, which of course vary according to the idiosyncrasy of the different cases; that they are more or less neurasthenic and show an incapacity for continuous exertion either mental or physical; that they frequently suffer from sleeplessness and from various disorders of the gastro-intestinal tract and its accessory glands, especially the liver; and finally that they manifest an instability of the nervous system which may have the serious effect, during convalescence from severe illnesses, or during pregnancy,

childbirth, or lactation in the female, of causing a recurrence of the acuter phases of the disease.

Again, many of the cases never wholly regain in the intervals between the attacks that condition of mental health which is compatible with true sanity. They either exhibit a state of exaltation which is inconsistent with normal mental existence, or they are unnecessarily gloomy and depressed; or on the other hand, they appear intellectually crippled and unfit for their ordinary or former duties. Such cases may, when sheltered in comfortable homes and freed from the anxieties and worries of life, continue to pass the whole or the greater part of their remaining existence without any further acute manifestations.

There is almost no form of mental alienation in which attacks of mania and melancholia may not occur, generally with a tendency to reappear more or less frequently during the course of the malady. Here again is illustrated the symptomatic and periodic nature of these forms of mental alienation and their dependence upon an underlying morbid condition of the nervous system.

It has been demonstrated over and over again that the forms of mental affection that are the most periodic are met with in persons whose family histories clearly reveal the presence of neurosis in the direct or collateral ancestry. Most writers on mental disease admit as a predisposing cause in almost all cases of circular insanity, heredity or a morbid brain constitution in from 80 to 90 per cent of melancholias, while with regard to mania it must be admitted that the same unanimity does not prevail, although recurrent mania is generally placed in this respect in the same category as circular insanity. The lowest average estimate of hereditary predisposition in mania, as given by most British authorities, may be stated as between 40 and 60 per cent. For obvious reasons, however, family histories are of all statistics the most unreliable.

It is necessary to exclude from the category of true periodic insanity many forms of mania and melancholia, the recurring attacks of which are directly due to definite and apparent external causes, such as alcohol, or to brain affections, such as those caused by traumatism, brain syphilis, or epilepsy.

Mania

The most prominent feature of this affection is a morbid excitement of the general functional activity of the cerebral cortex, which is expressed externally by a disordered activity of the psycho-motor mechanism. This disordered activity presents itself in two principal ways.

(1) The excitement is limited to the intellectual sphere and rarely extends beyond it. There is an intense desire for action of some kind, chiefly intellectual. The patients are constantly engaged in planning some new scheme, which is as constantly abandoned in favour of a newer idea.

(2) The disorder of motility passes beyond the mere desire for action, and expresses itself in pathological motor activity. This disorder may reach such a degree of intensity as to render the patient's movements quite aimless, and make his speech incoherent.

Upon the disorder of motility depends the mental exaltation and the phenomena of gaiety and pleasure which are invariably present in mania. The ordinary feelings of pleasure in a healthy organism depend upon the activity of the cerebral functions, especially the motor; and when the latter function has been pathologically exaggerated, the pleasurable feelings become correspondingly intensified.

In addition to the excitation of the motor functions of the brain, there is also an increased activity of the sensory functions. The organs of special sense become extraordinarily acute, especially those of hearing, sight, and smell. To such an extent do these organs or their central terminations become modified that their increased morbid capacity for comprehending the environment greatly complicates the symptoms of mania. The disorders of sight which result, and the intensification of the sense of hearing, give rise to the illusions which are also important symptoms, especially in acute mania.

The Periodicity of Mania.—Mania may not present any marked periodicity. In many cases only one or two attacks, separated by long intervals, may appear in a lifetime. In other cases the attacks are separated by much shorter periods,

and may recur every fifteen days, every month, or at the end of six weeks. In such short intervals the lucidity is often incomplete. When there is no complete lucid interval separating the attacks, this form of mania is described by many writers as Remittent Mania. When, on the other hand, the intervals are somewhat longer, and the patient's sanity is completely restored, the form is described as Intermittent Mania. Intermittent and Remittent Mania are in no sense distinct varieties, but ordinary attacks of Subacute Mania, separated by shorter intervals than those usually observed. Another form of periodic mania is characterised by attacks of long duration, separated by prolonged lucid intervals, it may be of many months or many years.

Mania divides itself clinically into two chief varieties, depending upon whether the excitement is only intellectual, or whether it passes into marked disorder of motility. The first variety is termed Subacute or Simple Mania, the second Acute Mania.

(*a*) *Subacute Mania.* (Simple Mania.)—The excitement of the psychical functions in this variety is generally little more than an exaggeration of the normal activity with a more or less profound alteration of the ordinary mental disposition and moral susceptibilities of the individual. Subacute mania is met with most typically in the exalted stage of true circular insanity (*folie circulaire*). It is always symptomatic of a strong hereditary predisposition, and occurs frequently among the higher degenerates. Indeed, the ordinary mental condition of many neurotic individuals who are not technically insane may be described as subacute mania. In the typical pathological varieties, however, the condition is more marked, and the manifestations oscillate between a mild excitement and a state of acute mania with great excitement and symptomatic bodily symptoms.

Physical Symptoms.—As a rule, physical symptoms, except when the affection is long continued, are absent. The patients look remarkably well, and all the bodily functions, including eating and sleeping, are well performed. In a few cases, chiefly those where the patient has had an opportunity of exhausting himself by means of over-indulgence in alcohol

and sexual excess, there may occur such symptoms as fibrillar tremor of the muscles of the lips and inequality of the pupils, which renders the differential diagnosis from general paralysis extremely difficult.

The physical excitement is moderate and well under control, the patient being able to co-ordinate his movements, his actions, and his words to the prevailing state of his ideation.

Intellectual Symptoms.—Intellectually the patient manifests marked mental exaltation, which reveals itself in a general tone of *bien être* and self-satisfaction. A rise in subject consciousness, with a corresponding decrease in object consciousness, conduces to an exaggerated idea of self-importance and self-consequence, which obscures his grasp of his whole environment. Consequently, an overstimulated imagination unguided by a just appreciation of his surroundings—upon which all true reasoning is based—leads the subject of this mental affection to propound schemes and projects of an impracticable kind, and to express himself in injudicious and unwise language. His projects are usually as quickly abandoned as they are formed, and embrace spheres of labour and enterprise that are unknown and foreign to his experience. Such patients will criticise and advise upon political, social, scientific, or literary subjects, of which they are usually entirely ignorant, and often discern such matters with wonderful acumen and cleverness. Although their plans and suggestions are usually unrealisable, they are by no means always absurd or impossible.

It is unfortunately in the conduct of their own business affairs that they not unfrequently give reins to these insane projects, with the result that before insanity is recognised by their friends serious financial losses or social catastrophes may be brought about by the pathological blundering of the subject. A man of cautious and mediocre judgment, without any apparent desire for notoriety, may suddenly and without warning become a rash speculator, a dashing but unguarded public speaker, or a clever and acrimonious writer of personalities. The typical cases display, as a rule, an originality, a personal distinction, and an assumed superiority

which are foreign to their normal mental condition. It is indeed asserted by many writers that patients in this condition have been usefully productive, have solved problems, have invented, and have even written brilliant works. Generally the memory for past events is extraordinarily developed. They are often able to recall at will whole pages of poetry, to quote extensively from standard prose works, and to give dates and details of events, all of which would be impossible in the same state. Many of them show a particular talent for the resuscitation and embellishment of personal and family histories of a scandalous character. Such persons are scathing and witty in their criticisms, and as all their personal injuries and affronts from early infancy are fresh in their minds, the scope of their animosity is generally a wide and varied one. In their power of expressing ideas they manifest a wonderful facility, and their command of language appears inexhaustible. Not only so, but the choice of phrases and words, the flow of conversation adorned by *à propos* jests, anecdotes, and pleasantries, varied according to their audience, display a mental brilliancy which is more often than not quite unexpected and unlooked for in the individual. Such qualities enforce a certain amount of unwilling attention on the part of those who are brought into contact with them, and consequently these patients are always a source of trouble in asylums or out of them.

The occurrence of acute excitement and incoherence of speech is rare, though at intervals the excitement is apt to increase to such an extent as to simulate acute mania; but delirium, on such occasions, is never absolutely incoherent. The mental exaltation is, however, so increased, that the prevailing ideas of pride, power, and possession, become crystallised into delusions corresponding to the ideas. The conduct of the patient then becomes overbearing or violent; he is intolerant of restraint, and though very aggressive himself does not scruple to bring false charges of violence against others.

The moral nature of this class of patients usually becomes completely perverted during the attack. Their natural affection for relatives is, except for selfish reasons, usually in abey-

ance. They are cruel, unjust, ungrateful, and untruthful. They are dominated entirely by their lower animal instincts and vices; the judgment being, as we have seen, enfeebled, the fear of public opinion which might naturally be expected —because of their inordinate vanity—to prevent them from open vice, fails to influence them to the necessary extent, and they plunge heedlessly into venereal and alcoholic excesses; they also manifest an extraordinary animosity towards others, even to persons scarcely known to them, which may end in foolish controversies, litigations, or criminal proceedings.

Course and Prognosis.—Simple Mania is of indefinite duration. It may run a short course of a few weeks or months, or may be prolonged over a period of years. It terminates frequently in recovery, although a few cases may become chronic. It must never be supposed that because in a case of mania the mental excitement is slight, the duration will therefore be short.

The frequently ascertained predisposition to nervous affections and insanity in such cases does not influence the prognosis unfavourably, but the contrary, so far as the individual attack is concerned. On the other hand, it must be borne in mind that simple mania may be the early manifestation of general paralysis, although a distinction is often possible, in so far as the incipient general paralytic usually manifests a generous and philanthropic disposition, a quality which is conspicuous by its absence in the true simple maniac. Again, simple mania often forms the first period of true circular insanity or *Folie à double forme*. A guarded prognosis is therefore necessary until these possibilities are eliminated.

Treatment.—The indications from the physical side are, especially during the early part of the affection, extremely few. The patients enjoy excellent health, and all the bodily functions are well performed. The appetite is good, sleep is not interfered with, and the muscular tone is rather increased. As the disease prolongs itself it is most frequently observed that the patients become anæmic and have a worn-out expression. When such symptoms appear, or if, as in a few cases, they are present from the commencement, tonic treatment should be adopted. Iron, quinine, strychnine, and the mineral

acids, alone or in combination, are of great service. Codliver-oil and malt extract may be found useful in cases in which there is emaciation or malnutrition; but where the latter conditions are present it is usually wise to confine the patients to bed for such a period as may be thought necessary. When the excitement becomes intense, prolonged warm baths (2 to 4 hours) at a temperature of 95° to 98° F. will be found very effectual. The bromides in pretty large doses, either alone or in combination with Cannabis "Indica," are very efficacious in allaying excitement; and chloral at bedtime in doses of from 15 to 30 grains is the best form of hypnotic.

Seclusion in an asylum is almost always necessary; but there is often great difficulty in having the patient certified, or in convincing friends and relatives who do not live in immediate contact with him, and who have consequently not suffered from his habits and conduct, that the symptoms indicate insanity. Three reasons may be stated to account for this difficulty. First, the prevalent popular ideas with regard to immoral or unusual conduct are uncompromisingly condemnatory. No allowance is made for mental instability, and the evil doings of the individual are attributed to moral perversity which ought to be suppressed by an effort of will. Secondly, the views of the laity on the subject of mental alienation are crude and unscientific. Incoherence in speech, uncontrollable excitement, or the presence of unmistakable delusions are essential in the public mind to the conception of insanity. Thirdly, the patient himself is genuinely unconvinced of his own insanity, and resists all attempts to deprive him of his liberty. From the description given above of the mental condition of cases of simple mania it will be understood how easy it is for such patients to impose their views upon other and sane people, and how difficult and delicate a matter it is for a medical man to certify them.

(*b*) *Acute Mania.* (Typical mania, raving madness.)—The general excitement of the cerebral functions attains in this affection its greatest height. There is great mental exaltation, combined with intellectual disturbance, sensory disorders and uncontrollable motor restlessness. The disease has no special ætiology, being, strictly speaking, idiopathic,

and most often no reliable external cause can be adduced to account for its origin.

Premonitory Symptoms.—The premonitory symptoms of acute mania may precede its full development by several days or weeks. The first symptoms are usually mental depression, vague fears, uneasiness or lassitude, together with such physical disturbances as loss of appetite, insomnia, or violent headache. During this period, however, there may be passing attacks of mild excitement, restlessness, and a strong desire for action, which does not as a rule find expression in any completed useful work. The patient's ideas are confused, and his projects absurd and unrealisable. Gradually the excitement, after various intermissions and relapses into depression, becomes established. The state of mind at this stage of the malady has been compared by the patient's friends to that of a semi-intoxicated person. In other cases the symptoms may suddenly appear without any marked prodromal signs, while in others again, and especially in females, marked hysterical symptoms may precede for many weeks the outburst of the attacks. Although the morbid mental condition forces itself upon the attention of the patient's relations, they are slow and reluctant to diagnose insanity. It is only when they attempt to restrain him or to oppose his plans and projects that his violent conduct and language convince them of the necessity of placing him under restraint for purposes of treatment and safety.

Mental Symptoms.—As in simple mania, the most characteristic of the mental symptoms in acute mania is intellectual excitement; but as this excitement proceeds, the patient experiences a greater difficulty in fixing his attention upon any one subject. His ideas become more numerous, and apparently more incoherent, until in many cases the symptom of incoherent speech presents itself. This incoherence of speech reveals the extraordinary confusion of ideas with which the patient's mind is cumbered. The exaggerated activity of the special senses of sight and hearing which has been already alluded to increases in a marked degree both the number and the incoherence of the patient's ideas. A word picked up in conversation, or the sight of a strange face, has generally the

effect of suggesting to the patient new ideas quite unconnected with his ordinary train of thought. The want of fixed attention and of proper judging power renders the patients liable to connect objects by their external, and not by their essential qualities, as in ordinary thought. From this arises their tendency to rhyme, and to mistake the identity of persons and objects around them. The motor excitement under which the patients invariably labour is shown by their incessant movement and loquacity. The patients are never at rest; they are continually expressing themselves in accordance with the disordered ideational process which has been described. They are extremely voluble and even intemperate in their language. This volubility may continue without intermission for whole days and nights, and during paroxysmal phases the use of articulate language may be entirely lost, and the patients express themselves in cries and shouts, until finally they become so hoarse that they are unable to make themselves heard. It is only in the acuter forms of the disease, however, that the latter symptom is observed.

The will power in cases of acute mania can hardly be said to exist. Actions are determined, not by any formulated principle or by the exercise of judgment, but by the idea predominant for the time. This idea may, as we have seen, be abandoned for a new one before the action prompted by the first idea has been completed. What has been said of the will power equally applies to the moral sense and to the affections of the patient. The complete loss of the moral sense and of the natural affections is a symptom invariably present in acute mania. Indeed, before the appearance of any other symptom a transformation in the disposition of the patient and in his attitude towards society and his relatives is observed by those who know him best. Not only do the patients become indifferent to the welfare of their nearest relatives, but not unfrequently their former affection is perverted into a condition of intense hatred. The mobility of the passions in such cases is shown by the extreme rapidity with which they pass from one emotion to another. The emotions of grief, joy, fear, and hatred may be seen in the same patient within a few minutes.

Notwithstanding the confusion of ideas and the vividity of the impressions to which the patients are subjected, the memory in many cases remains intact. Past events are easily recalled, and the events which occurred during the illness, and which it might be supposed, owing to the patient's mental confusion and excitement, would have left no trace behind, are most frequently recalled and accurately described after recovery. Not only do some of them remember what is said and done to them, but they are able to describe their extraordinary sensations and to repeat their incoherent sayings.

Insensibility to fatigue is another marked symptom of acute mania. It is well known that such cases can continue their movements for many days without sleep or rest, and yet experience no feeling of fatigue. The reason for this extraordinary power of endurance can only be explained by the absence of conscious attention and the predominance of the unconscious mind, which renders the actions of the patient more or less automatic; there is also diminished sensitiveness to pain, to heat, and to cold, which may partly be due to the reasons given for the absence of fatigue.

Hallucinations of the senses are extremely rare in acute mania, or if present they pass unperceived. At any rate, they have no fixed character, and are, like the impressions and ideas, essentially changeable and mobile.

Illusions of the senses, on the other hand, form one of the most important elements in this disease; but like all the other symptoms of acute mania, they are mobile and incoherent. The senses of hearing and of smell become especially acute, so that the patients are able to distinguish sounds and odours which in health would be impossible of perception. This hyperacute state of the hearing centre aggravates the mental condition by arresting attention, disturbing ideas, and feeding the various fleeting delusions in the patient's mind. The sense of sight also becomes hyperæsthetic, so that objects of no importance attract attention and disturb the mind. This hyperæsthesia of the organs of sense is most important in throwing light on the mental condition of certain cases of mania, for it reveals the state of the mind, overburdened by distorted impressions from the environment, with which the

subject is brought into much more intimate relation than in a state of health.

Physical Symptoms.—The physiognomy of mania is characteristic of the mental disorder. The face is suffused, although in a few cases it is pale. The features are altered and drawn, the eyes are bright and at times gleaming, the pupils manifest a striking mobility in their reaction to light, and under the influence of emotion they contract and dilate. The hair is disordered, and presents a peculiarly dry and brittle appearance. The facial expression is markedly altered, and betrays the instinctive and impulsive tendencies of the low passions which dominate the mind of the patient.

The disorder of movement which was pointed out, in dealing with the mental symptoms, as being such an important feature of the disease, expresses itself principally in the muscles which subserve the ordinary movements of the body. Excessive movement is more especially prominent in the arms, the hands, the fingers, and the legs. Not unfrequently it is also seen in the face, which is distorted by grimaces of a grotesque character. In a few cases these movements present the appearance of being spasmodic. When the patient's arm is held in the hand, for instance in the operation of feeling the pulse, a spasmodic contraction of the muscles of the forearm may frequently be felt. In the more acute cases the patients experience such an intense desire for movement that they tear their clothes, destroy articles placed in their hands, and disfigure the furniture, the windows, and the walls of their rooms. When the excitement reaches a still more acute stage, the movements may become violent and take the form of furious attacks upon other persons—attacks which are not actuated by any animosity on the part of the patient towards other people, but which are simply the result of an ungovernable necessity for action. In a few cases patients have been known to injure themselves seriously, and even to commit suicide, for the same reason.

All acute maniacs, especially during the acute stages of the disease, suffer from insomnia. The sleeplessness resists the most energetic treatment, and it is only by the free use

of large doses of hypnotics that at the most a few hours of sleep can be obtained in some cases. After awakening from this induced sleep, the symptoms are either aggravated or unchanged. When insomnia continues for a long time, it invariably has a bad effect upon the course of the malady. It tends to produce prostration, with symptoms of mental and physical debility.

The functions of digestion and nutrition are invariably affected. The tongue is furred; there is usually obstinate constipation, although in some patients that is not the case. Digestion, except in the more severe cases, appears to be accomplished, but it is probable that there is a failure in the functions of assimilation. The appetite is sometimes increased, sometimes diminished, but is always capricious. The patients invariably lose weight during the acute stages of the disease, but towards the end of the malady, when the symptoms have diminished, there is a tendency to lay on flesh. This is always a favourable symptom, provided that the mental symptoms continue to improve at the same time. When there is no corresponding change in the mental symptoms, the prognosis is unfavourable, and the case is in danger of becoming chronic. In most cases there is a tendency towards anæmia.

The temperature of the body is not increased during an attack of ordinary acute mania. Should there be a rise, of even 1° F., some complication may be looked for, and the patient should be carefully examined for the symptoms of some physical or other mental affection, such as general paralysis. The circulation of the blood is quickened, at any rate the appearance of the face and eyes countenance that supposition. It is held by some writers, especially Jacobi, that the pulse rate is normal and more often retarded than accelerated, and that the appearance of quickened circulation is accidental and due to the movements of the patient.

The secretion of the skin and salivary glands is increased. The saliva is got rid of by incessant and reckless expectoration, and the perspiration is said in some cases to give off the odour of mice.

In the female, menstruation is generally suppressed.

During convalescence it reappears, and its return is generally regarded as a favourable symptom. There are cases, however, in which this function continues during the whole attack, and it is always observed that the mental symptoms in such cases become exaggerated during the menstrual period.

The deterioration in the moral sense, referred to when discussing the mental symptoms, may in some cases advance during the course of the attack, until finally it becomes unmistakably manifest in the general appearance and habits of the patients. When the habits become very degraded; when the patient loses his human instinct; when, for instance, he collects rubbish, eats disgusting matter, and passes his urine and fæces indiscriminately, the prognosis becomes more unfavourable. In such cases a certain degree of mental confusion, with loss of memory and realisation of the surroundings, manifests itself. Sexual excitement with masturbation is almost always present, especially in females and in young males; and when the habit of masturbation becomes established, it tends to complicate the course of the disease by introducing a new and debilitating symptom, which must be combated.

There are many varieties of mania described by different writers, which need to be mentioned. Furious mania is merely a phase in the course of acute mania. Religious mania is a variety in which ideas of religion of an ambitious and powerful character are expressed by the patient labouring under intellectual excitement. Transitory mania has given rise to much discussion among writers on mental disease. The symptoms occur suddenly, last for a few hours or days, and disappear as quickly. Unquestionably, many of the cases are complicated by epilepsy, and may therefore be regarded as explosive manifestations of that disease. Attacks occur in alcoholic subjects, the result of poisoning by alcohol, while other cases may be due to the effects of such poisons as iodoform and carbonic oxide.

Ætiology.—Mania occurs in the course of many other diseases and pathological conditions, such as paralysis, senile decay of the brain, general paralysis, alcoholism, puerperal

affections, epilepsy, and in idiocy and imbecility. But acute mania being, as we have already remarked, an idiopathic disease, may arise without any apparent exciting cause. Usually, however, some more or less credible reason is assigned. It occurs most frequently between the ages of twenty and thirty. The cases increase in number from the age of fifteen to thirty years, and decrease from thirty years upward. The exciting causes in the female are usually connected with menstrual irregularities and with parturition. In the male, perhaps excessive drinking is one of the most commonly assigned causes. Generally speaking, all conditions which tend to weaken the system in predisposed individuals may be regarded as exciting causes—excesses of any kind, serious illnesses, physical accidents, moral shocks and fever are the most common causes.

Course and Termination.—The duration of acute mania is extremely variable. It may be reckoned by weeks or months, but rarely exceeds one year. The greater majority of cases recover within the first six months. The chances of recovery are only half as good during the second six months, and after the second year most of the cases may be regarded as hopeless. Recovery may take place suddenly, and although many of the cases do well, this mode of recovery is not as a rule regarded with favour. Other cases recover gradually during a series of successive relapses, the duration between the relapses becoming longer and the attacks themselves milder as time goes on, until finally complete recovery is established. The third mode of recovery is by gradual lysis, the symptoms abating progressively until they disappear altogether.

The termination of acute mania is by recovery in from 70 to 80 per cent of the cases. A very small percentage of the cases die, and when death occurs it is usually due to some physical complication, especially pulmonary disease. A small percentage become demented, while a certain number pass into chronic mania.

Prognosis.—As a rule the prognosis of acute mania is very favourable in uncomplicated cases. A high temperature, organic nervous symptoms, perverted habits, physical disease,

or exhaustion, and the long continuance of the symptoms are unfavourable signs.

Treatment.—The treatment of acute mania is essentially a sedative one, and for this purpose the patient ought to be isolated as far as possible from every circumstance that tends to irritate and aggravate the symptoms. Removal to an asylum so soon as the diagnosis has been arrived at is therefore, in the great majority of cases, imperative. In this way, the placing of the patient among strangers whom the patient does not know, and whose authority over him is indisputable, has a good moral effect. He thus acquires, in a very limited sense certainly, a degree of self-control to which it would be impossible to attain in his own home. A certain amount of liberty of movement is necessary, for the muscular agitation is merely a symptom, and its undue suppression can only act injuriously upon the course of the disease. In most cases, but especially in those in which there is physical debility and nervous exhaustion, it is well to confine the patient to bed during the earlier and more acute stages of the disease. In the absence of any such symptoms, there are some cases for whom such a course is not necessary, and it is perhaps better for them, when the weather permits it, to enjoy an average amount of walking in the open air.

The disorders of the digestive tract demand special attention and treatment, and the constipation, from which most of the patients suffer, should be attended to early in the course of the attack.

When the maniacal excitement becomes intense, the most effective method of treating it is by means of prolonged warm baths, accompanied by the application of cold water to the head. The temperature of the bath should be not less than 95° F. and not more than 98° F., and the patient should be kept in the bath from 2 to 4 hours. It will generally be found that after an hour or an hour and a half, even in very acute cases, the patient begins to be drowsy. When that occurs, he should be immediately removed from the bath and placed in bed in a darkened room. By this means a couple of hours' sleep, or many hours in favourable cases, may be secured. This treatment ought to be continued for a fort-

night, at the end of which time it is often observed that the acuter symptoms have begun to decline. There are cases, however, which resist this form of treatment.

By far the most important form of sedatives is the bromide salts. In discussing mental excitement in the chapter on Pathological Symptomatology, it was pointed out that the cortical neurons were in a state of hyperactivity with lowered resistance. In order to increase their resistance and diminish their activity, there is no drug so valuable as bromide of potassium or the mixed bromide salts. The exhibition of bromides should, in all cases of mania, be begun as early as possible, and the dose should be considerable, at least 30 grains three times a day forming the initial administration. The increase upon this dosage must depend upon circumstances, especially upon the effect and upon the constitution of the patient. Chloral, while also reducing the excitability of the cortical neurons, has also the advantage of being an effective hypnotic. It should therefore be given early in the evening in doses of about 30 grains or more, depending upon the patient and its effect. After three or four days, when the patient has come under the influence of the bromide, the dose of chloral may be reduced, and sleep will generally be obtained with a smaller dose.

Various other hypnotics and sedatives are of value, though not so certain or effective as the drugs just described. When the excitement and violence are very marked and require instant relief, hyoscine, hyoscyamine or duboisin in doses varying from $\frac{1}{120}$ to $\frac{1}{100}$ of a grain administered hypodermically will usually quieten the patient temporarily, but as a rule the result is not ultimately satisfactory. The combination of $\frac{1}{120}$ grain of hyoscine with $\frac{1}{4}$ grain of morphine is said to be a sedative and hypnotic combined. Sulphonal in doses of 30 to 40 grains, bromidia in doses of from 1 to 2 drachms, and paraldehyde in doses of 30 to 40 minims, as well as trional, chloralamide, etc., are often useful hypnotics.

With regard to opium, it may be said that its action is very uncertain. Besides, it conduces rather to the diminution than to the increase of neuron resistance, and is therefore primarily, at any rate physiologically, contra-indicated in the

treatment of mania. It may be, however, that the reaction following its use may in some way or other compensate for its direct effect, but only, I suspect, by reducing the strength of the patient. Unfortunately we have as yet no means of determining beforehand the cases in which the administration of opium may not be attended with bad results. Much depends, as in any other disease, upon the idiosyncrasy of the patient, and upon his tolerance of the drug. In fully more than one half of the cases of acute mania, the exhibition of opium is not only unsuitable, but injurious. The gastro-intestinal disorders are usually increased by the use of the drug; the body weight is reduced, and instead of calming the patient, it produces stupor, followed by an increase of excitement. There are, however, undoubtedly some cases in which the influence of the drug is valuable. For the first day or two the effect ought to be carefully watched, and if the patient tolerates it, it ought to be pushed as far as necessary. If, on the other hand, it is doing harm, it should be stopped at once. The best mode of administering it is by hypodermic injections of morphia, beginning with $\frac{1}{4}$ grain once or twice a day. If the patient stands the drug well, the dose can be rapidly increased, until as much as 3 grains per day are given.

Digitalis has been recommended in some cases with good effect. Recently, a German physician recommended infusion of *Adonis vernalis,* with bromide of potassium, which has the double effect of a cardiac stimulant and a nerve sedative. During convalescence various tonics may be given with the view of restoring the tone of the nervous system and improving the general health. Chief among these is quinine in combination with the mineral acids. Iron and strychnine are also useful, alone or in combination.

The dietary in acute mania ought to be as generous and easily digestible as possible. Finally, everything that tends to debilitate the patient should be carefully avoided, for, as a rule, the lower the tone of the physical health becomes, the more intense is the excitement.

(*c*) *Chronic Mania.*—Chronic mania is simply the indefinite persistence in a milder form of the symptoms of acute mania. The excitement is continuous, but less intense, and

more manageable. The patient is able to direct his energies and to fix his attention, especially upon any form of simple work which he was formerly in the habit of performing. The illusions and morbid ideas of the acute state become in this chronic state more fixed and crystallised, so that the cases resemble those of true systematised insanity. A certain degree of mental enfeeblement is always present; the speech of the patients is, however, incoherent, and they are usually unable to express themselves with much clearness. They are liable to acute exacerbations, during which the symptoms very much resemble those of the primary condition.

CHAPTER X

IDIOPATHIC MENTAL AFFECTIONS—*continued*

Melancholia and Circular Insanity

The characteristic feature of melancholia is a morbid depression of feeling, which expresses itself in every degree, from silent resignation up to the most violent despair. At the same time, there is an intellectual disturbance, in which painful impressions predominate. In contradistinction to mania, the ideational centres are more or less depressed and inactive, so that instead of the pleasurable feelings which result from their activity, there is occasioned a feeling of pain and misery due to their inaction. The consequent motor inactivity reveals itself in the state of the muscular system: the patients stoop, the movements are slow, and the muscles soft and wanting in tone. Much of the mental distress is probably due to neural tension, caused by the slow reaction of the motor mechanism, for, although depressed, the intellectual centres are by no means wholly inactive, and the pent-up energy of the patient, which in healthy states finds expression entirely through the voluntary motor mechanism, has to find for itself other and new channels. When the malady is very acute, this pent-up energy expresses itself in aimless movements, sometimes of a self-destructive nature, in restlessness, and in meaningless ejaculations.

Periodicity in melancholia is less observable than in mania, but it is probably not less frequent. In predisposed individuals, and among those who have had previous attacks of melancholia, which pass off in a few days, and of which the

patient may not complain, some of the attacks are apt to escape observation, except by those who are closely in contact with the patient. Remittent and Intermittent Melancholia have been described by some writers, but they do not form distinct varieties, being individual attacks separated by short intervals.

Several forms of melancholia have been described, and it is rare to find two writers upon mental diseases who agree as to the number of its varieties. For the present purpose, three varieties will be sufficient; (*a*) Simple melancholia; (*b*) Acute melancholia: (*c*) Delusional melancholia.

(*a*) *Subacute or Simple Melancholia—Mental Symptoms.*—In this variety the depression is not well marked; the patient is usually able to pull himself together, and if he wishes it, to conceal the symptoms from strangers. In company he may be able to converse rationally, even brilliantly, but at the same time he experiences a great disinclination for the society of others, and prefers to be alone with his thoughts. In some cases the mental pain may be described as negative. In all cases of simple melancholia there is a disinclination for work, a want of interest in former avocations and recreations, and a subjective feeling of being different from what they formerly were, and from other people. This feeling may increase to such an extent as to make the patient imagine that there is something distinctively peculiar in his outward appearance which is apparent to other people, and which corresponds to his other subjective sensations. From this arise often a desire for seclusion, a feeling of insecurity, and a want of self-confidence, accompanied by vague fears, which are seldom expressed except to intimate friends. It sometimes happens that the patients may confide their thoughts to strangers. It is always unfortunate when this occurs, because their intelligence is apparently unimpaired, and their statements are apt to be taken seriously. Now, such patients are always self-accusative; they attribute their illness to faults and vices of their own, which are imaginary, or at any rate have no causal relation to the mental affection under which they are labouring.

The most important symptom in this, as in all forms of

melancholia, is the presence of a suicidal impulse. Perhaps in the form we are now considering the danger of suicide is most great, because the patients possess the full command of their reasoning powers, as well as the power of fixing the attention upon any definite act or proposal. They are, therefore, capable of planning with considerable skill and detail the most appropriate method of ending their own existence. For some unexplained reason a few of the subjects of simple melancholia display an impulse towards homicide, and many obscure family tragedies owe their origin to this affection.

Occasionally in the course of simple melancholia there are acute exacerbations in all respects similar to the ordinary symptoms of acute melancholia. Such attacks are of short duration, generally lasting only a few hours. They may be irregular, or may tend to recur periodically.

Disturbances of the intelligence are, as has already been indicated, generally absent. The delusions of the patient are merely distorted views of his own relation to his surroundings, and are never crystallised into the definite false ideas which are common in the acuter forms. The same remarks apply to hallucinations of the senses. Auditory sounds, such as ringing in the ears, are common enough, but they never take the form of pronounced words or sentences.

Physical Symptoms.—The general bodily health of the cases in this class is not, as a rule, much run down. Physical debility, with anæmia, and dryness of the skin and hair, may be observed, but these indications are superficial. As a rule the patients are of good physique, as well as possessed of more than the average mental ability.

The most striking physical symptom is disorder of the gastro-intestinal tract, and especially of the stomach. The cases suffer discomfort after a large meal, for the appetite is not generally impaired. Some cases do, however, manifest a disinclination for food, and in them also, after even a small quantity of nourishment, physical discomfort, with aggravation of the mental symptoms, may generally be observed. The gastric symptoms point to a failure in the digestive function of the stomach, probably due to a diminished or altered secretion of hydrochloric acid, which permits of the development

of fungi. After eating there is distention of the stomach, with eructation of acid and fœtid gases. The intestinal disorders show themselves by constipation, which is obstinate in some cases, by defective biliary secretion, and by diminished action of the intestinal glands.

Sleeplessness in most of the cases is a very common and distressing symptom. While some of the cases sleep for a few hours, others pass many sleepless nights in the course of the affection. When natural sleep is obtained, it is most frequently unrefreshing and disturbed by dreams and nightmare.

The patient's movements are slow and listless, except when he voluntarily rouses himself to activity, and the muscular and nervous tone is slightly lowered.

Ætiology.—Subacute melancholia generally occurs suddenly, and chiefly affects people who are hereditarily predisposed to the neuroses. It may occur at any period of life, and not unfrequently after middle age. An exciting cause is generally assigned by the patient and his friends, such as business worries, a financial loss, or the death of relatives. The influence of such causes in precipitating the attack may perhaps be conceded.

Prognosis.—Considering the comparative slightness of the symptoms, the prognosis is not so favourable as might be expected. The attacks are apt to be prolonged and the recovery to be very gradual. It may be many years before the patient fully regains his former feeling of mental tone and confidence. In patients with a strong hereditary tendency, the prognosis, as regards the single attack, is perhaps more favourable than in others, although in the case of the former, liability to a relapse is much greater. This form of melancholia is more periodic than any other form, for the reason that it is most commonly met with among the hereditarily predisposed. The danger of suicide is another element which should greatly influence the prognosis. Most of the cases end in recovery, and when death does occur, it is almost always due to suicide.

The treatment of subacute melancholia is the same as in acute melancholia, and will be discussed under that disease.

(*b*) *Acute Melancholia.*—The commencement of this affection is generally slow. The patients may complain for many weeks or months previously of gastric disturbances, constipation, general malaise, lassitude, or insomnia. As the affection begins to establish itself, there is observed a change of disposition, with a tendency to worry over trifles. The relations to the environment generally, and to friends and relatives in particular, become altered; there is, as in mania, a rise in subject consciousness, with a decrease in object consciousness. Instead of, as formerly, being interested in things outside of himself, the patient becomes entirely engrossed in his own personality, and in the various ways, imaginary or real, in which it may be injuriously affected. The duration of the premonitory stage is uncertain, the symptoms becoming gradually worse, until the period of full development is reached.

Mental Symptoms.—Each patient may be said to present a distinct variety of symptoms, but for the purposes of description those symptoms may be classified as disorders of the feelings, of the will power, and of the intelligence. The first group, disorder of the feelings, consists of a painful depression, for which the patient cannot account, and from which he cannot escape. The will power is profoundly affected, the patient being unable to control his thoughts or his actions, to pursue his usual avocations, or to take any interest in his surroundings. The knowledge of this powerlessness reacts unfavourably upon the condition, and increases the mental depression. The mind of a melancholic patient is by no means inactive, and all the ideas which arise are coloured by the prevailing depression in which he is steeped. His views regarding himself and his surroundings are accordingly uniformly gloomy. This feeling of impotence, combined with the presence of painful ideas, leads him to discover improbable causes for his sufferings, and it is this search for a cause, combined with a disordered judgment, which gives rise to many of the intellectual disturbances in the disease.

The intellectual disturbances take the form of painful ideas of culpability. The patients accuse themselves of having caused their own illness, of having ruined and dishonoured

their friends, of having brought trouble upon other people through misdemeanours or imaginary crimes which may be of the most heinous nature or childishly unimportant, but which are always made to bear a definite causal relation to their own affection or to the troubles of other people. The definiteness of the delusions varies much in different cases. In some patients they are not expressed at all, but the predominance of painful and false ideas may always be inferred from the patient's attitude and manner.

As the psycho-motor depression increases, and the painful feelings predominate more and more, the patients become restless and agitated. They are unable to remain in one position or to sit down for any length of time; they rub their hands mechanically, tear their hair out, or tear their clothes, or give expression to cries and ejaculations of a painful nature. On the other hand, some cases in similar circumstances become overpowered, and remain silently passive and irresponsive in their distress.

During the acuter stages of the disease hallucinations and illusions may become common, and when they occur they exercise a marked effect in further disordering the intelligence. Hallucinations of hearing are especially vivid. These hallucinations are always, like the prevailing mental tone, of a depressing nature. Voices accuse them, insult them, threaten them. A few patients have hallucinations of sight, and see flames or lights burning and faces of human beings or of animals. Many Continental writers, in particular Schüle, lay stress upon the facts that melancholics are subject to neuralgias of various nerves, especially the intercostal and fifth cranial nerves; and that they suffer from hyperæsthesias and anæsthesias of various parts of the body, all of which are misinterpreted by the patient, and tend to fix his false ideas.

The gravest of all the symptoms, and the one that demands most attention, is the danger of suicide. Suicide in melancholia is due to more than one cause. The chief reason undoubtedly is the exaggerated egoism which characterises all the cases. Most of the patients are afraid of dying; perhaps they dread death more than anything else, but the dread of

the many and terrible evils which they constantly expect to overwhelm them may suddenly become stronger than the dread of death. Although there is no question that melancholia is the most painful affection which can befall a human being, yet the ordinary explanation of suicide occurring as a perversion of the love of life is not in accordance with our knowledge of the mental condition of these cases. Suicide is no doubt prompted by the mental sufferings and frequently suggested by hallucinations, but in true melancholia a perversion of the love of life into desire for death is never met with. If such a perversion exists, it must be looked for among the insanities of the degenerate, and even there the act of suicide is most often committed, as in melancholia, in response to a powerful impulse. A considerable number of melancholics undoubtedly commit suicide impulsively, just as they tear their clothes or occasionally commit homicidal assaults.

Physical Symptoms.—The mental depression under which melancholic patients labour reveals itself externally in the facial expression, the gait, and the manner of carrying themselves. The features are drawn, the face is pained, and the general aspect is gloomy and dull. The movements of the patients are slow, the gestures unfrequent, and there is a tendency to assume a slightly stooping posture. In the quieter cases the patients are immobile, passive, and irresponsive, while in the agitated cases the movements of the patients are automatic, and are not made in response to any stimulus in their environment.

Of all the physical symptoms, the gastro-intestinal are the most interesting and the most important. The tongue is either raw and red-looking, as if denuded of epithelium, or it is enlarged, dry, and deeply-furrowed, or in other cases it may be small and streaked longitudinally with a white fur. When the tongue is protruded, a fine fibrillar tremulousness will generally be observed, which in some cases continues well on into convalescence. In almost all cases of melancholia a certain amount of dilatation of the stomach is observed. In many cases careful percussion will reveal the descent of the stomach to within an inch of the umbilicus or even

farther. In other cases it is not so manifest, although on palpation the splashing sound which, according to Bouchard,[1] is characteristic of that condition, may be elicited. The subjective sensations of the patient certainly point to this condition. They are usually afflicted with dyspepsia, hyperacidity, due to fermentation, and flatulence. These symptoms are usually aggravated after a meal, and at such times react unfavourably upon the mental state. In many cases a condition of subacute catarrh, extending from the pharynx and including the whole mucous membrane of the stomach, sets in. It is probable that in many cases this catarrhal condition extends to the intestines as well, and it is in such cases particularly that we meet with the most obstinate refusal of food. This symptom, while no doubt suggested by the false ideas of culpability and unworthiness, and sometimes by the hallucinations of hearing, is primarily of physical origin, and due to the disorders which have just been enumerated. Constipation is almost invariably present, and extremely difficult to overcome. There can be no question that the nutrition and tissue metabolism of the patients are seriously affected by the absorption of toxic materials from the stomach and bowels. This secondary condition of auto-intoxication reacts unfavourably upon the course of the disease by profoundly altering nutrition, destroying appetite, and lowering the vital tone of the nervous system.

The general sensibility of the skin is diminished, so that the patients do not feel pain so acutely as in the normal condition, and are able to treat with indifference serious wounds, either received accidentally or inflicted by themselves. While there is this general condition of analgesia, there are at the some time hyperæsthesias of limited portions and neuralgias of certain nerves, especially the intercostals.

The pulse in melancholia is usually slow and soft. The circulation of the blood is not vigorous, as may be observed in the tendency towards superficial venal congestions, coldness and blueness of the extremities, and occasionally œdema of the ankles and feet. The bodily temperature is usually slightly lowered, but not to any marked extent. There is

[1] Bouchard, *L'Auto-intoxication.*

always a loss in body-weight during the attack, which sets in with the commencement of the disease. It is due to mental anxiety, malnutrition, and refusal of food. The malnutrition manifests itself in dryness of the skin and its appendages.

Course.—Melancholia runs a continuous course, sometimes short, sometimes extending over many months, even years. There are daily exacerbations, the symptoms becoming more aggravated in most cases in the early morning, in a smaller number in the evening. A few cases show a tendency to exacerbation only once or twice a week. Recovery sets in with signs of improvement of the general health. The colour of the skin becomes altered: food is taken more readily; the body-weight increases, and the patient begins to comprehend what is said to him and to respond to the observations of others.

Prognosis.—Prognosis in melancholia is generally favourable, perhaps slightly less so than in mania, but it may be generally stated that about 80 per cent of the cases recover. Prognosis is of course affected by the presence of many organic affections, cardiac, hepatic, and pulmonary, from which many of the patients suffer; also by age and by the previous habits of the patients. As in mania, heredity does not affect the prognosis unfavourably, so far as the individual attack is concerned. Finally the prognosis must be influenced by the degree in which the symptoms of refusal of food and suicide are present.

Treatment.—It is well to approach the treatment of melancholia with the certainty that the disease will run its course, and without expecting any startling results from specific forms of medication. At most we can only expect to modify the symptoms, maintain the strength of the patient, and by these means shorten gradually the length of the attack. The first symptom which has to be combated in most cases of melancholia is the nervous irritability and mental agitation under which most of the cases labour. For this purpose, rest in the recumbent position in bed has always a good effect in allaying excitement and restoring nervous strength. When there is great agitation, prolonged warm baths, of two or three hours' duration, may be given, if the patient is not too feeble or exhausted.

Of all specific drugs, opium is the best and most reliable. Its effect in melancholia is more certain and much more reliable than in mania or any other mental disease. There is a small proportion of cases in which this drug has evidently a bad effect, and in such cases its use should, of course, be instantly discontinued. Opium may be given in the form of morphia hypodermically, when the agitation is very great and where a strong tendency to suicide exists, but given in this form the drug is not always satisfactory. As a general rule it is best given in the form of the tincture by the mouth, commencing with 5 minim doses, thrice daily, which should be gradually increased until as much as 60 to 90 minims daily are administered. Tincture of nux vomica in uniform doses of $2\frac{1}{2}$ minims may be given at the same time. In the cases in which opium succeeds, restlessness decreases, sleep is induced, the nutrition of the body is conspicuously improved, and the tendency to suicide averted. When opium is not administered, various hypnotics may be given for the treatment of sleeplessness, from which most of the cases suffer. The best, most efficient, and safest of all these is paraldehyde. It can be given in doses of 1 to 2 drachms without fear of cardiac depression, and it is therefore particularly useful in weak and debilitated cases. Its taste and smell, which persist for many hours, is its most serious drawback. The taste can, however, be effectively disguised and the administration rendered almost agreeable. Sulphonal, in doses of 20 to 30 grains is another drug of great service for this purpose, and with the advantage of possessing no flavour; but its continued administration, especially to anæmic persons and females, is dangerous, as it tends to accumulate in the system, and is a frequent cause of hæmato-porphyrinuria. Trional has been greatly praised by some physicians.

The most effectual way of attacking the symptoms of melancholia is by attempting to remove the disordered condition of the mucous membrane of the stomach and bowels. Where the gastro-intestinal disorders are evident, the indications for treatment in this direction are imperative. First of all, the stomach should be carefully washed out with warm alkaline water, the bowels should be moved with a pretty

strong dose of calomel, followed in the morning by a seidlitz powder or some alkaline aperient. When this has been done, the administration of antiseptics should be immediately commenced. The most effective of these are naphthaline, calomel in minute doses ($\frac{1}{4}$ grain) frequently repeated, salol in 8 grain doses thrice daily, betanaphthol, salicylate of bismuth, iodoform, and resorcine. The washing out of the stomach should be continued once or twice a week. When there is reason to believe that there is dilatation of the stomach, or that it contains fungi or low vegetable ferments, one or other of the antiseptic substances, such as carbolic acid, boracic acid, corrosive sublimate, or permanganate of potash, may be used for washing out. It is significant in this connection that Bouchard considers opium to have a good effect in dilated conditions of the stomach.

Under this method of treatment it will be generally found that the acuter symptoms of the disease become much modified, that the restlessness and agitation pass off, and that the patient is able to sleep naturally. The depression continues, but the patient is better able to endure it, and the course of the disease is materially affected.

It is absolutely necessary to maintain the patient's strength, and for this purpose abundance of easily digestible and assimilable food should be given. Of these, eggs, milk, nourishing vegetable soup, with, where that is advisable, some mild and light alcoholic beverage, are the best. When the patients absolutely refuse food, forcible feeding with the nasal or œsophageal tube must be resorted to. In such cases only liquid food can be given, such as eggs beaten up in milk. It is well to add, once or twice a day, to this mixture some powdered butcher meat, a very good preparation being Carnick's Beef Peptonoids. At the time of feeding, any of the various drugs mentioned may be administered.

In ordinary cases, unattended with very great excitement, and without refusal of food, the physical symptoms of anæmia and malnutrition may be treated in the ordinary way by means of such drugs as quinine and the various preparations of iron.

The danger of suicide is an element in every case of

melancholia which should always be assumed to be present. It can only be guarded against by the utmost personal vigilance on the part of those in immediate charge of the patient, and by the removal from his reach of all the ordinary means by which the act can be committed.

The moral treatment of melancholia is no less important than the medical. It can only be applied by those who, by long experience, have acquired an intimate knowledge of the characteristics and mental peculiarities of the class. It is useless to argue with the patients, and worse than futile to attempt to rouse them from their lethargy and self-absorption. During the acuter stages of the disease, it is much better, while never relaxing vigilance in supervision, to leave the patients as much alone to their own thoughts as possible. They are unfit for work, either mental or physical; the sayings and doings of others are indifferent and distasteful to them; and any form of amusement or recreation becomes absolutely painful; they appreciate sympathy, and when it is intelligently given by a physician who understands that his patients are diseased and irresponsible, it always has a good effect, and is almost always appreciated.

(*c*) *Chronic or Delusional Melancholia.*—When melancholia tends to become chronic as a terminal condition of the acuter form, the symptoms become modified, and although the patients retain their delusions, and a certain degree of mental depression, the former remain as a sort of habit of mind, and the latter loses much of its painful character. The mind becomes apathetic, and the general mental condition is indicative of enfeeblement, with impairment of intelligence and of feeling.

Apart from the terminal condition of chronicity, there are other forms of melancholia to which the term chronic may apply, both on account of their long duration and their frequent incurability. The term delusional melancholia may suitably be applied to such conditions, for the delusions are more or less fixed, and form the predominating symptoms of the disease. There are many varieties of chronic delusional melancholia, described under different names according to the character of the delusion, but they may all be classified under the two following heads, viz.—Anxious Melancholia and

Hypochondriacal Melancholia. These forms have been described by some foreign writers as *Secondary Paranoia*, because the delusions of persecution and the hallucinations of hearing resemble those of true systematised insanity.

Anxious Melancholia — Mental Symptoms. — The commencement of this affection is slow and insidious. The patients are assailed with vague and indefinite fears of some impending evil, which they are unable to express or realise. As the disease advances, the terrors of the patient become more accentuated, and occasion paroxysms of agitation, which closely resemble the excited stages of acute melancholia. These paroxysms are generally of short duration. Gradually the patients begin to formulate definite ideas of persecution; sometimes they imagine that they are poisoned, or that they are possessed by the devil, or that they have committed crimes, for which various forms of torture are being prepared as a punishment. In the same patient the false ideas generally assume a fixed and uniform type. While one patient may lament the fact that he can never die, another may firmly believe that he is the cause of all the misery in the world, and a third, that in order to expiate his crimes he is to be burnt alive. It would be impossible to attempt to enumerate the variety of such delusions. It may be generally stated, however, that they are always of a self-accusative character, and that even when the patients believe themselves to be the subject of active persecution on the part of other people, they never think of reacting against their persecutors in the manner that true persecution maniacs often do, but always accept their supposed injuries as a more or less just retribution on account of their imaginary misdemeanours.

Hallucinations of sight and hearing are very common in this class. Such hallucinations are usually very vivid, and their influence in fixing the delusions and in aggravating the symptoms is undoubted. The hallucinations of hearing especially are generally of the same character as the prevailing mental tone and the delusions. They frequently suggest the desirability of suicide, and as the patients very often believe that the voices are authoritative, coming directly from the Deity, from the Devil, or from some supernatural agency

which possesses them, it may easily be imagined that the influence of the hallucination is often imperative.

The patients usually fear death, their mental anxiety and anguish being directly due to this fear, yet during the paroxysms of agitation, suicide is frequently committed. At these periods also they may be seized with uncontrollable impulses towards homicide, or with a desire to destroy, which they not infrequently put into action.

Under the heading Præcordial Melancholia Krafft-Ebing has described a variety of this disease, in which during the agitated period there is a distressing subjective feeling of præcordial oppression, accompanied by the sensation of suffocation. This is a most painful symptom, which is variously interpreted by the patients, and regarded as the cause of their mental distress. In some cases where the disease is of long duration a certain amount of change takes place in the subjective personality of the patients. They deny everything said regarding themselves, declaring that they do not exist, were never born, shall never die, that they are of microscopic size. This variety of delusion has been specially described by Cotard as "le délire de négation." The same writer has also pointed out that in a limited number of cases of this kind there is an expansive form of delusion with ideas of greatness.

Physical Symptoms.—The facial expression of such cases is downcast and overclouded; the features are drawn and anxious-looking; and the skin of the face is usually pigmented and of a dark-brown or dark-grey colour.

The digestive functions are not markedly affected. The patients are able to eat well, often ravenously, but there is usually a distressing feeling of fulness, accompanied by an exacerbation of the mental symptoms, after the ingestion of food.

Respiration and circulation are only slightly affected; the pulse is usually feeble, and the respiration shallow. There is a tendency to anæmia, to œdema of the extremities, and to congestion of the lungs. In the older cases, atheroma of the larger arteries and of the valves of the heart is common.

Prognosis. — Anxious melancholia is always a serious affection; its duration is long, and it is rarely recovered

from. The prognosis is more favourable in young cases, and in those not complicated with organic diseases, especially cardiac.

Treatment.—On account of its more or less chronic course, the treatment of this affection is limited to the alleviation of the symptoms. In those cases in which heart disease is present, if the nature of the cardiac lesion permits it, digitalis should be given, and its administration will usually be found to be attended with good result upon the mental symptoms. In other respects, the forms of treatment which have been sketched out for acute melancholia may be applied whenever the symptoms indicate their adoption.

Hypochondriacal Melancholia.—Hypochondria is one of the affections of the degenerate, and would naturally fall to be described when treating of the mental symptoms of that class. In the hypochondria of the degenerate, however, there is no melancholia, no marked disturbance of the intelligence, and no hallucinations of the senses. In hypochondriacal melancholia all these symptoms are present.

Mental Symptoms.—The commencement of the affection is always slow and gradual. The patients become gloomy and retiring in their disposition; they experience lassitude, with a disinclination for work, for recreation, and for the society for others. Gradually they begin to be assailed with a distressing uneasiness regarding their bodily health and the state of their internal organs. The attention of the patients becomes concentrated on these subjects, until at last they become convinced that they are afflicted with some serious and extraordinary disease, that some of their organs are wanting or displaced, or that an organic function has been permanently arrested.

Frequently they are the subjects of hallucinations and illusions of various kinds. The hallucinations are always connected with the prevailing mental condition, and confirm the patient in his delusions. The illusions are chiefly of general sensibility. The patients experience an infinite variety of painful sensations in various organs of the body, which they describe with minuteness. Such subjective sensations may be of a visceral kind of an acutely painful

character, or may embrace sensations of heat and cold in various parts of the body. Such patients are usually clamorous for treatment, and when they have exhausted all medical opinion within their reach, they not infrequently request to be sent to an asylum. Their isolation is very often required in the interests of public decency, on account of their intense desire to recount their symptoms to other people, or on account of the means they often adopt to relieve their imaginary symptoms. Suggestions of a suicidal tendency are frequently present, but they are seldom put in action. Notwithstanding their depression of spirits they are apt to resent strongly any suggestion as to the unreality of their symptoms, or the appearance of treating them in a slighting manner.

Physical Symptoms.—Physically the patients present some of the facial characters of melancholia; the skin is yellow, the conjunctiva injected, and the expression of the eyes restless and furtive. The patient is always on the outlook for sympathy, and for signs of the impression which the garrulous narration of his symptoms makes upon other people. This furtive look is apt to suggest insincerity on the part of the patient—a trait which cannot be justly attributed to them. Their appetite is usually good, although digestion is not vigorous, and they suffer considerably from dyspepsia, accompanied by flatulence, palpitation, and a feeling of suffocation, after food. They are more or less subject to sleeplessness, and their sleep is often disturbed by dreams.

Ætiology.—This form of melancholia is more common in the male sex. It is associated with physical and nervous debility, and may arise sympathetically in connection with various organic diseases, and some diathetic conditions, especially the rheumatic.

Prognosis.—The prognosis of hypochondriacal melancholia is always unfavourable. The disease is of long duration, and when recovered from, leaves behind it a condition of physical and mental debility. In young subjects the prognosis is more favourable, especially if, as is often the case, it is due to sexual excesses of any kind. The removal of the cause in such cases, and the restoration of the general health, is usually followed

by recovery. Hypochondriacal melancholics are subject to a variety of intercurrent diseases, such as catarrh of the bronchi, congestion of the lungs, and gastro-intestinal affections, which very often prove fatal.

Treatment.—The treatment of this affection is very difficult, unless the full confidence of the patient can be obtained. If the physician is successful in securing that—always a difficult task—the treatment should be chiefly moral. The habits of life of the patient must be supervised, his attention directed towards work and recreations which interest him, and he should be induced to take abundance of open air exercise, and, if possible, to do garden work. The various physical symptoms, such as constipation and dyspepsia, require special treatment, while the nervous system may be strengthened by the administration of such tonics as quinine and strychnine. Much good has been obtained in many cases by cold bathing, and especially by the application of cold douches to the head and spine, as also by the careful application of statical electricity.

Circular Insanity

(*Folie Circulaire, Folie à double forme*). This form of insanity is characterised by the regular succession of maniacal and melancholic attacks, which succeed each other in the order stated, or inversely. These attacks succeed each other usually without any intermission, and are followed by a lucid interval of longer or shorter duration. This is, properly speaking, insanity of double form. If the attacks follow each other without a lucid interval, we have continuous insanity, or true *Folie Circulaire*. These distinctions, however, are of little importance, and the term "circular" insanity sufficiently includes all the varieties. As a rule the attacks closely resemble each other, so that when one attack has been well observed, the character of future attacks may be easily foretold.

The attacks of mania and melancholia are similar to those which we have already considered. All the varieties of mania and melancholia may combine to form an attack of this insanity. As a rule, however, in the great majority of cases

there are some special features which characterise the periods of mental affection which I shall briefly allude to.

Period of Mania.—The form of mania is usually of the type which has been described as simple mania. There is general exaltation of the mental functions, without any incoherence of ideas, without any affection of the senses, and without any marked motor disorder. The patients are capable of reasoning correctly, of observing what goes on around them; and they appear to take a special interest in the affairs of other people, and in most things that have no special connection with their own affairs. As in simple mania, the memory is hyperactive, to such an extent that the patients themselves are often astonished at their power of recalling insignificant events, and of repeating poems and literary passages which they believed had completely faded from their memory. Such patients speak and write incessantly, usually with great aptitude and force of expression. At the same time, they seem to lose their sense of proportion and of the fitness of what ought to be said and written. Like the subjects of simple mania, they engage in enterprises and speculations of a rash and unrealisable kind, but which, nevertheless, generally present to the observer a semblance or probability of success.

The moral conduct of these patients is usually faulty, and their want of judgment prevents them from gauging the consequences of their actions. To such an extent is this want of judgment carried, that they are often familiar and confidential with utter strangers, and sometimes rude and insolent to people they have never seen before. They lose their natural affection for their friends and relatives, whom they neglect, while to gain their own selfish purposes or attain their vicious ends, they may lavish their money upon strangers. At the same time, they are neither generous nor facile, but on the contrary, cruel, quarrelsome, and vindictive. They are usually most untruthful. Among their predominating vices are theft, and alcoholic and sexual excesses. According to some writers these vices are true impulses in patients suffering from this affection, and should be termed kleptomania, dipsomania, and erotomania.

In a few cases paroxysms of acute mania may occur in the course of the simple mania just described, but they usually last only for a few hours or at most a few days. During the paroxysm there may be complete incoherence of ideas, with violent conduct and unconsciousness of what they are doing.

In a very small number of cases the maniacal period may take the form of acute mania throughout. In other cases, very limited in number, delusions of an exalted nature, similar to those found in general paralysis of the insane, may exist. The patients behave in an extravagant manner, by dressing fantastically, tearing their clothes, or storing up rubbish, such as rags, pieces of paper, and bread crumbs. As formerly stated, however, such mental symptoms are rare, the prevailing type of the maniacal period in circular insanity being that of simple mania.

Physical Symptoms.—The physical symptoms are unimportant, and generally do not differ from those observed in simple mania. Nutrition is, on the whole, improved during the attack, and the physical functions, like the mental, are accelerated, and sometimes exaggerated. J. Falret[1] has described symptoms of cerebral congestion in a small number of cases during the maniacal period. These are slight loss of consciousness, convulsive movements, and sometimes epileptiform attacks; sometimes slight embarrassment of speech or temporary hemiplegia. The symptoms are of short duration and disappear with the period of excitement.

Period of Melancholia.—The melancholic period is liable to more variation in intensity than the maniacal period, although the greater number of patients suffer only from simple melancholia. In the simple melancholia of circular insanity the patients show a marked desire for solitude and a disinclination for mental or physical exertion of any kind.

Mental Symptoms.—The affection is more passive than active, as may be seen from the immobility of the patients, their desire to be left alone, and their disinclination to answer when spoken to. The mental pain and depression are very acute, and the patients experience at

[1] Falret, *Études Cliniques sur les Maladies Mentales*, 1890.

the same time a feeling of incompetence for physical and mental work which is almost paralysing. They become wholly indifferent to their surroundings, and lose all natural affection. In appearance these patients present the characteristic physical symptoms of melancholia, with, in addition, a pallor of the face, and an exhausted expression, more pronounced than are usually found in the latter disease. In a minority of the cases the melancholia may be more active and complicated by delusions of a depressive and self-accusative character. In these cases the patients appear to exist in the constant fear of some impending calamity or disaster, which may be unintelligible to themselves, or may be the result of well-defined delusions. There is nothing distinctive about the delusions to separate them from those of melancholia. They range over ideas of culpability, incapacity, and condemnation. In some cases they take the form of persecution, with hallucinations of hearing, or hypochondriacal delusions, similar to those described under chronic melancholia.

Stupor.—It is uncommon to observe stupor following or attending melancholia in circular insanity. When it does occur the form is what has been termed stupor of the second degree (Newington's Delusional Stupor). The patients retain their consciousness of what is occurring around them. They usually suffer from delusions similar to those observed in melancholia, and from hallucinations of sight and hearing. Physically the patients appear mentally overwhelmed, remain in a state of complete immobility, and do not respond when spoken to or when stimulated. Occasionally, and during short periods only, they manifest slight cataleptiform symptoms, which are of a transient nature, the rigidity passing off from the muscles of the limbs. General sensibility is diminished; the extremities are cold and swollen; respiration is slow and shallow; and the temperature of the body slightly below normal. The habits of the patient in this stage are usually faulty.

Physical Symptoms. — The physical symptoms in the depressed period of circular insanity correspond generally with those which have been observed in melancholia. There

is loss of appetite, diminished nutrition, and a falling away in the weight of the body. Constipation is always present. The other bodily functions are disturbed in a way similar to what has already been described under melancholia.

Ætiology.—There is complete unanimity among all writers on this subject, that hereditary predisposition is prominently observable in almost all cases of circular insanity. Very often insanity is directly transmitted from the parents to the children. In a certain number of cases circular insanity is itself transmitted, but in the majority of instances of direct transmission the heredity is not homogeneous, the parents having laboured under some other form of mental disease. The most common form of heredity is, however, the transmission of the neurotic constitution, which predisposes the subjects of it to periodic forms of mental alienation. The neurotic constitution may also be acquired in various ways, and lead to the production of circular insanity.

Course.—The disease usually commences with periodically recurring attacks, separated by lucid intervals, of either mania or melancholia, and after the disease has become established, the attacks of insanity succeed each other in the order in which they commence. This order is not definite: either the mania or the melancholia may precede the other. According to Clouston,[1] mania occurs first in 90 per cent of the cases, but his view is not borne out by some observers, *e.g.* Ritti, Meyer, and J. Falret. The durations of the two periods are not always the same, the period of depression being generally longer than that of excitement. In attacks with a very short cycle, the durations of the period are, according to Ritti, usually the same. Great irregularity exists in the duration of the intermission, although there are some regular cases in which the lucid interval bears a stated relation to the length of the mental affection.

The diagnosis of this condition can only be arrived at after prolonged observation of the case.

Prognosis.—The prognosis is, on the whole, very unfavourable. Although mania and melancholia are in themselves eminently curable conditions apart from their periodicity, yet

[1] Clouston, *Mental Diseases*, p. 235.

when combined in the form of circular insanity, the periodicity becomes so intense as to baffle all attempts at its removal. Looked at from the point of view of periodicity, the prognosis is more favourable in the variety properly known as insanity of double form, than in that known as true circular insanity, because in a few cases of the former the intermission may be so prolonged as practically to restore the patient for years to a life of sanity and usefulness. In the latter form, there being no lucid interval, prognosis is still more serious.

Treatment.—With regard to the treatment of circular insanity, the general condition being so unfavourable, no general form of treatment is applicable. Clouston has recommended the administration of quinine in large doses as an antiperiodic, in order, if possible, to prevent the return of the attacks, and Legrand du Saulle[1] has published a case with very short attacks which was cured by this form of treatment. The treatment of the period of the attack and of the symptoms, both physical and mental, is essentially the same as should be applied in the treatment of mania, melancholia, or stupor. Except where the lucid intervals are of long duration, it is almost always necessary to place the patients in an asylum, on account of the variety of their symptoms, and the uncertainty that attends each of the periods of the attacks.

[1] Legrand du Saulle, *Annales Méd. Psych.* (1888), vol. i. p. 53.

CHAPTER XI

IDIOPATHIC MENTAL AFFECTIONS—*continued*

PROGRESSIVE SYSTEMATISED INSANITY (PARANOIA), AND THE PATHOLOGY AND MORBID HISTOLOGY OF THE IDIOPATHIC INSANITIES

THIS form of insanity, which as the title indicates is not periodic but progressive, is variously known as Persecution Mania, Monomania of Persecution, Monomania of Unseen Agency, Megalomania, Monomania of Pride and Grandeur, etc. It was first described by Pritchard [1] in 1835 as Monomania, but Lasègue,[2] in 1852, was the first to call it Persecution Mania, and to treat it as a separate form of mental affection. Subsequently MM. Falret and Magnan,[3] especially the latter, have fully evolved the various phases of the disease, and have presented it to us in the complete form in which we now know it.

This disease is a chronic mental affection, characterised by delusions which tend to become fixed and systematised by hallucinations of hearing, of touch, and of pain. The affection ultimately ends in a complete transformation of the personality of the patient and of the primary symptoms of the insanity, in consequence of the appearance of delusions of an ambitious character, with corresponding hallucinations of hearing. Magnan, in his monograph on the subject, entitled "Le

[1] Pritchard, *Treatise on Insanity*, 1835.
[2] Lasègue, *Archives Gén. de Méd.* 1852.
[3] Magnan, *Le Délire chronique à évolution systématique*, 1890.

Délire chronique à évolution systématique," divides the affection into four stages. The first period, or period of incubation, is characterised by illusion, insane interpretation, and mental anxiety. In the second period, or stage of persecution, the principal phenomena are delusions of persecution, hallucinations of hearing, and of general sensibility. The third period, or stage of ambition, presents hallucinations of hearing of an ambitious character, along with delusions of grandeur. The fourth and last period is that of failing intellectual power or dementia.

Period of Invasion.—The period of invasion is generally a slow and gradual one, the disorder manifesting itself at first indefinitely, with malaise and uncomfortable sensations, which forcibly attract the attention of the patient, especially when these sensations tend to increase in intensity. Consequently the patients become moody and introspective. The appetite for food, capacity for work, and the power of sleeping well, are all diminished. The patients begin to suspect that there is something peculiar in their personal appearance, which unduly attracts the attention of other people. From such ideas the transition is very easy to the belief that they are stared at for some purpose, that they are despised or distrusted or socially tabooed. Notwithstanding the prominence of these ideas in consciousness, the patients retain full command of their judging powers, and in their better moments they succeed in overmastering these strange thoughts and foolish fancies; but only temporarily, for they are sure to return with more persistence than ever. In this way the patient's life becomes a constant struggle between hesitating doubt of his false ideas and the self-assertion of his better judgment. Gradually the struggle ends in favour of the disease, and the patients, losing self-control, may openly accuse people of staring at them or annoying them. When this condition is reached, they become extremely sensitive regarding the motives of other people, and spend their time in analysing insignificant actions, such as the opening of windows or the closing of doors, coughs, or phrases accidentally heard, all of which they imagine to have some reference to themselves. Even acts of kindness or affection may appear

to them as insults, and silence itself is an offence. The prudence that formerly prevented them from noticing openly the actions of others is now set aside, and the patients often set themselves to watch their supposed enemies and to listen surreptitiously to their conversation. To these imaginations the patient adds a review of his former life, persistently dwelling upon slight oversights and insults which he may have received, until he becomes convinced that he has been long a victim of a systematic persecution. The stage of invasion is very rarely met with in asylums, the patients as a rule having sufficient self-control to conceal their insanity. Sometimes the invasion period is so vague and its symptoms so slight as not even to attract the attention of relatives. It may also be very short—so short that the appearance of hallucinations of hearing, which usher in the second stage of the disease, may be mistaken for its commencement. It is no unusual thing to be told when such cases come to an asylum that they have been ill only for a few days, but more extended observation of the case and the confessions of the patients themselves generally result in showing that the disease must have been in existence for months or years previously. As a rule, however, the patients are reticent and ashamed of their delusions, which they try to conceal, and it is therefore difficult, until their full confidence is secured, to get at the true facts of the case.

With the establishment of delusions of persecution of a vague kind, and not directed specially at any person or persons, the auditory hallucinations appear, and the patient, after a longer or shorter period of invasion, enters upon the second stage of the malady. It is usually about this time—between the first and second stages—that the patients are sent to an asylum, on account of assaults committed or for threatening violence, or because they have complained to some authority regarding their sufferings.

Second Period—Period of Persecution.—Hallucinations of hearing of a disagreeable nature are a constant symptom of this stage. They begin vaguely as sounds or noises in the ears, and proceed steadily until isolated words are formed, and finally complete sentences and long conversations are heard by the

patient. In the majority of cases the hallucinations of hearing are unilateral, but they are often bi-lateral. Magnan states that when the hallucinations are bi-lateral, different voices are heard in opposite ears. Where several voices are heard by the patient, some of them abuse him and use insulting and bad language towards him, and other voices may take his part and justify him. In many cases the patient hears regular altercations proceeding between his supporters and his detractors, while a neutral party or arbiter may be heard judicially deciding between the contending parties. Magnan has also pointed out the remarkable fact that in bi-lateral hallucinations the voices of the detractors and of the supporters are often referred to opposite ears, without at any time interchanging.

It is under the persistent influence of hallucinations of hearing that the disease becomes systematised. At first the patient's attention is vaguely directed towards unknown enemies, whom he designates indefinitely as "he" or "they." Gradually, however, his suspicions begin to circle within narrower limits, and he may come to believe that he is the victim of a conspiracy on the part of some public bodies, of secret societies, or even of supernatural agencies. The suspicions of the patient may stop there, but they frequently end in being directed against an individual, either a relative, a neighbour, or a well-known person in his vicinity. This is always an unfortunate feature, for it may involve serious consequences to the suspected person, who, being in complete ignorance of any such ideas on the part of another, is usually off his guard and unprepared for attack. The patient may not always believe that the suspected person actually carries on the work of persecution himself, but that he employs agents to do it for him, or that he has at command certain occult influences, by means of which he pursues his nefarious practices. Hallucinations of hearing of a disagreeable nature persist throughout the whole of the second stage, but after this stage has been established, other hallucinations begin to set in.

First among these are hallucinations of taste and smell. Patients who have reached this stage not infrequently take

the most minute precautions with regard to the choice of their food and the manner of cooking and eating it. Some of them, in order to avoid poisoning, buy, when at large, various articles of food at different shops; are particular about drinking fresh water, and only live upon the simplest articles of diet, which if possible they cook for themselves. The subjects of this affection are among those who at this stage of the disease send their food and sometimes their urine and fæces to public laboratories for analysis. They may also complain of gases being injected into their bedrooms and of fine powder being thrown about them, especially during the night. In order to escape as much as possible from these nuisances, they carefully stuff the keyholes of the doors and the chinks between the sides of the door, the floors and walls with pieces of cloth and newspaper. Many of them sleep with paper wrapped round their heads and bodies, in order the more effectually to protect themselves from the action of deleterious substances.

Succeeding closely on the hallucinations of taste and smell are those of general sensibility. Many patients complain of obscure pain, twitching of muscles, sensations of burning, and other anomalous feelings, generally of a localised nature, which they attribute to the action of acids, telephone or telegraph wires, or to spiritualistic agencies. These hallucinations of touch and pain irritate the patients exceedingly, and it is under their influence that, losing self-control and in a paroxysm of frenzy, most of the unfortunate assaults of a serious nature are committed. The irritation caused by the combination of hallucinations frequently gives rise to attacks of excitement, which may last for many hours or even days, and in which the patient's attitude and manner closely resemble that of an acute maniac, although without any incoherence or inconsequent motor restlessness.

Lastly, genital hallucinations make their appearance. These are of an intense and distressing nature, absorbing the patient's whole attention and disturbing his self-control more than any other kind of hallucination. In men they take the form of a belief in attempts at castration, emascula-

tion, bleeding from the genital organs, or attempts at sodomy; in women, of pregnancy, obscene practices, rape, and the introduction of foreign bodies into the vagina.

The succession of the hallucinations is not always so regular as I have stated it; but as a general rule they follow that order. The advent of new forms of hallucinations does not imply that the preceding ones are displaced; on the contrary, they are often aggravated.

The state of sensory hallucination is the most prominent and characteristic stage of the disease. Its duration is long, and the sufferings of the patient are often intense. It may last from two to twenty years without any modification in the violence of the symptoms. It is important, however, to bear in mind that all the cases are subject to remission of the symptoms, some to a slight extent, while in others there may be complete immunity from sensory disturbances during the remission. In the latter class the delusions also abate or disappear. These lucid intervals may last for periods varying from a few days up to several months or even longer. Sooner or later, however, an exacerbation takes place, with a return of all the virulence of the former symptoms.

The foregoing description of the second stage of Persecution Mania corresponds to the Monomania of Persecution and Suspicion of English writers.

Third Period—Period of Exaltation and Ambition.—In proportion as the disease advances, and at the end of a time which varies with each case, ideas of grandeur are superadded to the existing ideas of persecution. The delusions of persecution do not at once pass away; in many of the cases they persist during the life of the patient; but they gradually lose their intensity, and only remain in the mind as a disagreeable memory.

The manner of the transformation is slow and gradual, and has been variously accounted for. Foville considers that it is the result of logical deduction. The patients begin to think that they must be persons of some consequence to have been for so many years the subjects of such inveterate persecution, and to have inspired so much envy and jealousy. Consequently they imagine that they must be of noble birth, and

that the families to which they nominally belong are merely those of their adoption. Whether such a theory is correct or not, the transformation of the insanity is, in many cases, due to a hallucination or series of hallucinations which suggest ideas of grandeur. On the other hand, there are cases in which the transformation is often spontaneous, and may manifest itself without any assignable cause within the course of a very short time. A chance word, a sentence read in a newspaper or a book, or an insignificant incident, may form the starting-point of a new train of ideas, antithetical to the former mental state. Magnan believes that the advent of delusions of ambition marks a more advanced stage of mental deterioration. According to this authority, delusions of grandeur seldom manifest themselves in insanity except in individuals who are hereditarily degenerate, or in those in whom the intelligence is markedly lowered by serious or prolonged mental disturbances, such as chronic insanity, general paralysis, and chronic alcoholism. The superimposition of ambitious ideas in this affection may, therefore, be regarded as an indication that the brain resistance is decreasing, and that the intellectual faculties are slowly losing their healthy integrity.

Along with the delusions of ambition the hallucinations of hearing of a corresponding nature displace the previous hallucinations of the second stage, which were always disagreeable. In the cases where the hallucinations of hearing have been uni-lateral, the ambitious hallucinations appear in the opposite ear to that occupied by the painful hallucinations of the second stage. The delusions of ambition are extremely various, and include those of pride, grandeur, power, wealth, and supernaturalism. Like the delusions of persecution, they are well defined, systematised, and definitely expressed. They present none of the fleetingness and incoherence which are met with in mania, and there is no facility or changeableness such as characterises the delusions of general paralysis. There is, however, a tendency towards mysticism, with the formation of new words to express terms which are the products of the patient's diseased imagination, and a haziness bred of the difficulty of reconciling the life of phantasy with the true

environment, of which latter the patient is normally conscious. There is also an extravagance in the delusions, which lends additional proof to Magnan's theory of lessened cerebral resistance. This period corresponds to the Monomania of Pride and Grandeur of English writers, by whom it is described as a separate disease.

Fourth Period—Period of Dementia.—From the stage of ambitious delusion to that of dementia the progress is a very slight and very gradual one. The dementia is not equivalent to what is known as secondary or terminal dementia, which occurs after acute mental disease, but is the form of mental weakness of a mild kind and of intellectual lowering, in which the patients retain their physical activity and their power of conversing in a rational manner on various subjects outside their delusions. The mysticism to which reference was made markedly increases. There is a tendency to wandering of the thoughts and an absurd extravagance in expressing opinions in connection with the delusions.

After a sustained conversation the patient's intellectual power will often be found to be exhausted, as shown by a tendency to wander from one subject to another, and a slight incoherence of ideation. The fourth stage has been ignored by many writers, notably by Falret and Ritti, and although it may be absent in some cases, it is undoubtedly present in a great number.

Some confusion is apt to occur owing to the absence of this affection from the classification of most British authors. Paranoia or systematised delusion is now generally regarded, following the French school, and in accordance with the teaching of Magnan, as capable of division into two distinct clinical forms: (1) Progressive systematised insanity (Paranoia primäre), and (2) Systematised delusion in the degenerate (Paranoia degenerativa). (See p. 319.) The former, of which a description has just been given, follows a distinct evolutionary course of a regular progressive nature and is never recovered from. The latter is extremely irregular, seldom progressive, is complicated by attacks of mania, melancholia, and other neuroses, and may end in recovery.

The following tabular statement will be of use in ex-

plaining the diversity of classification and opinion on this subject.

The first and second periods of Progressive Systematised Insanity and the Persecution Mania of the degenerate	correspond to	The Monomania of Persecution of British authors.
The third stage of Progressive Systematised Insanity and the ambitious delusions of the degenerate	correspond to	The Monomania of Pride and Grandeur of British authors.

Ætiology and Course.—The principal features of this disease are its long duration, which may extend over many years (according to Magnan, fifty years or more), and the progressive metamorphosis of the symptoms. The disease manifests itself in adult age, usually after thirty, and in persons who had previously been of sound health and free from any intellectual disorder. There is a persecution mania which is peculiar to the degenerate, and which will be afterwards described; but the subjects of progressive insanity present few of the peculiar mental or physical stigmata of the degenerate. It is probable that the affection is more prevalent among people of a retiring, modest, or sensitive disposition, and who are, therefore, more liable to be disturbed by adverse circumstances. Hereditary predisposition is admitted by all authors to play a less unimportant part in the production of this disease than in many other forms of insanity. The disease shows itself more frequently in the female sex. It usually manifests itself between the ages of thirty and fifty years. When the symptoms appear at a much earlier age, or during adolescence, it almost conclusively shows that the subject belongs to the class of the degenerate. As regards exciting causes, it appears to be very prevalent among married females who have led unhappy domestic or conjugal lives. Prolonged disappointment, reverses of fortune, remorse, jealousy,

and vicious education, are among the causes usually assigned. Various physical causes have been mentioned, but they may be briefly stated as comprising all the influences which produce physical debility.

Prognosis.—The prognosis depends upon a careful diagnosis of each case. When the symptoms point indubitably to chronic systematised insanity, the prognosis is grave and the chances of recovery are *nil*.

Treatment.—As the disease is hopelessly incurable, there is no form of treatment applicable to the general condition. The patients are sent to an asylum for the protection of other people; and when admitted, the isolation from their former surroundings, the discipline, order, and routine of the life have usually a most favourable effect in modifying all the symptoms of the affection. It is necessary above all things that the physician should obtain the confidence of these patients. This can only be done by patience, quiet observation, and sympathy. In the way of medicinal treatment, we can only follow general indications. If the patient's health is reduced, as is frequently the case, after leading a life of irregularity, fear, and suspicion, it is necessary to administer nourishing food and tonics. One of the best tonics for the purpose is arsenic, which is not only very efficient in itself, but on account of its tastelessness does not arouse the suspicions of the patient on the subject of poisoning. When sleeplessness is a prominent symptom, and the patients suffer most from hallucinations during the night, any of the ordinary hypnotics may be safely administered. Finally, for the paroxysms of excitement which so frequently occur, morphia may be given hypodermically, also hyoscine, and duboisin. The latter is the most valuable drug of all if properly administered, and really is effectual in permanently calming the patient; it is best given in small doses by the mouth twice or thrice daily. The patients are always better when engaged in work, if possible at outdoor work.

The Pathology and Morbid Histology of the Idiopathic Insanities

Pathology.—Of the pathological nature of the periodic idiopathic neuroses we know almost nothing. Whether they depend for their origin upon auto-intoxication, the result of faulty metabolism, or upon an inherent dynamical change in the neurons of the brain cortex, is at present a mere matter of speculation. That they are accompanied by metabolic changes, especially by a diminution in the toxicity of the urine during the height of the attack, by gastro-intestinal disorders, and by changes in the constituent character of various bodily secretions, has been abundantly proved by the independent researches of many observers. But whether such metabolic changes are primary or secondary to the disorder in the function of the nervous system is as yet unknown. In many allied affections, such as cretinism, myxœdema, epilepsy, and general paralysis, there is every reason to believe that it has been already demonstrated that the disorder of the nervous system is secondary to intoxication. With regard to the functional neuroses, including hysteria, neurasthenia, and the acute idiopathic insanities, we must in the meantime be content with the extent of our present knowledge.

Morbid Anatomy.—The naked eye appearances of the brain of those dying in the course of attacks of idiopathic acute insanity are practically *nil.* Many attempts have been made to establish the occurrence of certain appearances of a more or less constant character, but without result. It is asserted by some that in the brains of persons dying in acute mania congestion of the membranes, especially of the pia mater, congestion of the grey matter of the convolutions, or dilatation of the blood-vessels in the white matter is usually present. Others confidently assert that no such signs are constantly apparent, and my own experience coincides with the latter statement. We are also informed that in melancholia anæmia of the brain is usually present, but we are also told that congestion is as common in melancholia as in mania. Those who try to base a macroscopic pathology upon the appearances found *post-mortem* in the brain in mania or melancholia are

probably actuated unconsciously by the older ideas of the supposed nature of these affections. Mania was believed to be essentially a hyperæmic disease: therefore the brain should be congested; melancholia depended upon an accompanying cerebral anæmia: therefore the brain and its membranes should present a corresponding appearance. The *post-mortem* naked-eye appearances of the brain in those dying after single attacks of mania or melancholia present nothing distinctive.

When the disease has run a chronic course, or when the person has had several attacks, certain changes take place in the brain and its membranes, which are visible to the naked eye. The skull cap is often thickened and increased in weight by the subperiosteal deposition of bone. The bone may be thickened throughout, but a more usual appearance is the exhibition of protuberant bosses disposed chiefly over the frontal and occipital regions. This condition is due to a nutritive change, the result of prolonged or frequently repeated vascular engorgement. This appearance is, as might be expected, very common in chronic mania. A thin diaphanous skull cap is also met with in chronic cases both of mania and melancholia. In such cases the diploe disappears altogether, especially in the parietal region.

The dura mater is frequently found adherent to the inner surface of the skull cap, rarely to the whole surface, more frequently as partial adhesions indicative of bygone inflammatory change. It is rare to find thickening or neoplasmic changes affecting this membrane.

A milky opacity of the pia arachnoid, especially marked along the sulci and the immediate vicinity of the blood-vessels, may be seen to a slight extent in the brains of those dying at middle age, but it is particularly common and well marked in cases of periodic insanity. This condition depends upon a partial thickening of the membranes, especially of the pia, and partly upon the organisation of fibrinous exudates and plastic lymph in the trabeculæ intervening between the membranes in the sulci. According to Ford Robertson,[1] who studied the changes microscopically, they depend upon

[1] Ford Robertson, *Journal of Mental Science*, October 1895.

proliferation, degeneration, and shedding of the endothelial cells, accumulation of granular *debris* in the arachnoid spaces, and hyperplasia of the connective tissue. These morbid changes he considers due to the abnormal and perhaps irritative qualities of the arachnoid fluid. This view is supported by the fact that the cerebro-spinal fluid in the insane is usually acid in reaction, whilst in the normal brain it is alkaline. The outer surface of the arachnoid, which normally is smooth, often becomes granular.

In the more chronic and frequently recurring forms of idiopathic insanity, atrophy of the brain, generally partial and localised, is frequently met with. It is chiefly limited to the fronto-parietal region. Bevan Lewis states the following to be the order of frequency in the motor area—(*a*) the cortical centre for the lower extremities; (*b*) for the upper extremities; (*c*) for the face and tongue; whilst the separate frontal gyri come in order of frequency between the two latter. Last of all come the tempero-sphenoidal, occipital, and angular regions.[1]

The chief changes in the brain in acute idiopathic insanity are microscopic, and affect the neurons. I take this opportunity to give a short general description of chromatolysis.

The term chromatolysis denotes not only a morbid change in the chromatic elements of the cell, but has been extended so as to include all pathological affections of the neuron, whether caused by section of the axis cylinder, acute or chronic poisoning, idiopathic degeneration, senile decay, hyperpyrexia, or other morbid states occurring shortly before death, or *post-mortem* changes. The condition was first observed by Nissl in the cells of the nucleus of the facial nerve after section of the periphery of that nerve. The cells stained faintly, and there was observed a finely granulated disintegration of their protoplasm. Similar morbid appearances in the cells of the anterior horns of the spinal cord were observed by Flatau and by Sano in cases dying from five days up to several weeks after amputation. Marinesco observed that after section of the axis cylinder of a motor cell or of the distal or proximate fibres of a sensory ganglion there occurred

[1] Bevan Lewis, *Text-Book*, p. 491.

a degeneration of the chromatic elements, first of all in the cone of origin of the axis cylinder, and afterwards spreading gradually throughout the whole cell until the nucleus became eccentric. If the cut nerve fibres were again brought into contact, restoration of the cell, accompanied by increase in its size and very deep and diffuse staining of its contents, was observed. As a result of the experimental administration of poisons to animals, similar changes were observed in the nerve cells, varying however in site and in character according to the poison and the mode of its administration. Various poisons affect chiefly cells in various parts of the nervous system; some poisons appear to produce a chromatolysis commencing in the elements around the nucleus and spreading to the periphery of the cell, while others originate the process at the cell periphery, but in each case the ultimate result is the same. According to Goldscheider and Flatau and to Van Gehuchten, alteration in the functionating of nerve cells, either in the direction of hyperactivity or of diminished activity, is followed by chromatolysis.[1] If the latter opinion be correct, we have, as might be anticipated, an explanation of the occurrence of chromatolysis in mania and in melancholia, although the cause of the interference with the normal cell action must for the present remain obscure.

In general chromatolysis the Nissl bodies become affected. They disintegrate into a fine powdery substance, lose their definite shape, and collect into masses either around the nucleus or at a part of the periphery, or in separate masses at various parts of the cell body and larger processes. Their crescentic or otherwise regular distribution within the cell disappears, and the achromatic fibrillar substance remains unstained. Gradually the whole cell body assumes this degenerate appearance; the nucleus becomes displaced, and ultimately disintegration of the primitive fibrils of the protoplasm takes place. The last and most fatal stage of all is the degeneration of the nucleus, after which no reparation in the function or structure of the cell can take place. The nerve cells are not all equally affected; many of them remain

[1] Van Gehuchten, *Normale und Pathol. Anatom. der Nervenzellen*, p. 49.

perfectly normal side by side with others perfectly disintegrated. Those cells which are faintly stained, but which retain an outline, are known as "ghost cells." Others may be observed in various stages of sclerotic degeneration, their processes either broken off abruptly near the cell, or atrophied at a considerable distance from it. With the exception of the axis cylinder, which almost always suffers, and which manifests large varicose swellings extending to the collaterals, the other cell processes do not necessarily suffer at first, at any rate in proportion to the chromatolysis of the cell body. Ultimately, when the processes break off from the cell body, they degenerate more rapidly; but while the cell nucleus persists and the processes remain in contact with the cell, the finer protoplasmic processes retain their organisation.

In cases of mania and melancholia extensive chromatolysis is usually met with, and large numbers of "ghost cells" and cells in an advanced stage of disintegration may be seen. Robertson and Orr[1] remark, "In the acute manias we estimated the number of cells affected by chromatolysis at about 50 per cent in one case, 80 per cent in another; while in a third every cell appeared to be involved. In the acute melancholias the percentage was much lower, being in each about 25 per cent."

The presence of chromatolysis varies in the different forms of idiopathic insanity. It is most extensive and intense as a general rule in mania, less so in melancholia, and least of all in systematised delusional insanity. The opportunities for investigating the morbid histology of the last-named affection are comparatively few, owing to the fact that death so rarely occurs in the earlier stages of the disease. When death does occur, the patients are usually advanced in years, and the natural senile changes mask to a great extent the essential microscopic appearances of the brain elements.

Secondary Changes.—Proliferation of the neuroglia elements is found in chronic cases, in older cases, and in cases in which the affection has been frequently recurrent. This proliferation is chiefly observed in the outermost layer of the cortex, where it forms a thick felting of fibres immediately

[1] Robertson and Orr, *Journ. of Ment. Science* (October 1898), p. 741.

underneath the pia. Increase in the neuroglia elements in other parts of the cortex is rare except in the immediate neighbourhood of degenerating nerve cells and in the white matter.

When the neuroglia elements are increased, and their fibres numerous, they destroy, by encroaching upon, the medullated and non-medullated fibres of the cortex, which exist in great numbers in the external cortical layer; and the consequent degeneration of the medullated fibres produces the peculiar "amyloid body" appearance which is so commonly present in this layer in many forms of chronic insanity.

In a few cases thickening of the walls of the blood-vessels, with slight extravasation of leucocytes, tortuosity of the vessels, or occasional aneurysmal dilatation of the arteries, is present.

CHAPTER XII

CONFUSIONAL INSANITY—TOXIC INSANITY

It is due to the writings and researches of Chaslin [1] and Kraepelin [2] that the common origin and similarity of the apparently dissimilar clinical groups forming this affection have been recognised.

Their community depends upon the following facts:—

(1) The mental state is one of confusion of ideas, and cannot be compared with the mental condition found in either mania or melancholia, although either mental exaltation or mental depression may be present singly or combined or alternating irregularly.

(2) The physical symptoms are invariably characteristic of asthenic prostration and malnutrition, accompanied or not by febrile symptoms of varying degree.

(3) The condition can usually be traced to nervous shock or physical exhaustion, which profoundly disorders nutrition and the bodily functions generally; or to the presence of micro-organisms or their toxins in the blood and tissues; or to defective glandular secretion; or to the introduction, voluntary or accidental, of poisons into the system.

I. Clinical Forms caused by Physical Exhaustion, Nervous Shock, or Malnutrition

(*a*) *Delirium of Collapse.*—In 1864 Dr. Herman Weber [3] read a paper before the Medico-Chirurgical Society of London

[1] Chaslin, *La Confusion Mentale Primitive.*

[2] Kraepelin, *Psychiatrie*, 1896.

[3] Weber, *Med. Chir. Transactions* (London, 1865), vol. xlviii. p. 135.

on delirium or acute insanity during the decline of acute diseases. To this disease he gave the name of delirium of collapse. The term "collapse" was used to indicate the shock received by the system about the time or after the commencement of the crisis in acute diseases. This shock may be so slight as altogether to escape attention, while in other cases it manifests itself by a sudden sensation of weakness, a feeling of anxiety, or by a true collapse. A failure of the power of the heart in many cases appears to be intimately connected with this condition.

The diseases in which these phenomena were observed to occur were typhoid fever, typhus fever, pneumonia, especially of the apex, acute rheumatism, erysipelas, and cholera. Since the time of Weber it has most frequently been observed to occur after influenza. This mental affection is also frequently met with in the early period succeeding surgical operations. Dr. J. Christian Simpson[1] has given a very full and interesting account of post-operative insanity. He states that the type of the disease is Acute Confusional Insanity. In some cases the affection comes on gradually, while in others it appears suddenly without any warning. The average time for the appearance of the symptoms, reckoned on nearly 200 cases, is the fourth day after operation, although in many abdominal cases the symptoms appear after the wound is healed. The time of occurrence is always after the subsidence of the pyrexia. The commencement of the affection is usually very rapid. The patients become restless; their sleep is disturbed, and they manifest a desire to get out of bed, and struggle against any restraint which may be employed to prevent them. They have a tendency to tear their clothes, and to violently resist anything that is done for them.

Physical Symptoms.—The physiognomy of these cases is characteristic. The face is pale, the hair disordered; the features are pinched, and the expression is one of intense excitement, combined with terror. The whole appearance of the patient indicates a profound disorder of nutrition; the body-weight is diminished; the pulse is feeble and slow; and the skin, especially that of the extremities, is cold, clammy,

[1] Simpson, *Journ. Ment. Sc.* 1897, p. 86.

and marked with ecchymotic patches. The tongue of the patient is covered with fur, and the breath is offensive. They refuse nourishment, as a rule, but may take it in a mechanical manner. The pupils are dilated, and the tendon reflexes are, as a rule, exaggerated.

The temperature of the body is almost in all cases normal, but in a few cases it may be increased to 100 or 101° F.

Mental Symptoms.—The mental symptoms are characterised by the suddenness of their outbreak. Weber[1] describes the mental condition as most nearly approaching a maniacal delirium, with delusions of an anxious nature and hallucinations of the senses, especially of hearing, but also of sight. According to Chaslin,[2] the prevailing mental condition is one of confusion; the words are incoherent, pronounced sometimes with volubility in a loud tone, sometimes with a theatrical emphasis, at other times whispered, as if the patient were confiding a secret. The incoherence of ideas and of speech is entirely different from that which is observed in acute mania. While in acute mania the procession of ideas is so rapid that the faculty of speech fails to express them coherently, in confusional insanity, on the other hand, ideation itself would appear to be weakened and disconnected. This condition is apparently due to a debility of the nervous system. The patients lose all idea of location. They mistake the identity of those around them, and they are incapable of understanding, and consequently of intelligently responding to, any verbal communication that is made to them.

The emotional condition of such cases is, as a rule, negative; they are neither exalted nor depressed. It is, therefore, remarkable that many of the cases express delusions of persecution, of self-accusation, and of negation: while others appear to develop false ideas of self-importance and of grandeur. The delusions in such cases, however, are deficient in that tone and reality which characterise similar delusions in mania and melancholia. They reflect, in fact, the weakened condition of the patient's mental state. In the acuter forms of the affection the movements of the patient become aimless; his

[1] Weber, *loc. cit.*

[2] Chaslin, *Confusion Mentale*, 1895.

speech is absolutely incoherent; and his consciousness is evidently a blank. A few cases present tremulousness of the finer movements, and an affection of the speech not dissimilar to that met with in general paralysis. Apart from their rarity, such symptoms are usually transient. Unlike patients suffering from mania and melancholia, the memory of events occurring during the illness is obliterated, except perhaps in those cases where the delusions, having become more or less fixed, persist during convalescence.

Course.—Convalescence from this affection is very slow. The patients are usually in a state of great physical weakness; consequently their mental condition is one of extreme irritability and facility. According to Griesinger,[1] the mental disturbance which occurs after pneumonia is very slight and transitory, but of the type which has already been described. In those cases which have been observed as occurring after influenza the mental symptoms are, as a rule, so slight as to be comparable to a very mild form of dementia. When it has been found necessary to send such cases to an asylum, the acuter symptoms which demand isolation have usually passed away at the time of or immediately after admission, and the only symptoms that are then observable are slight mental confusion, mental weakness, with a loss of memory for recent events, and some confusion of orientation.

Prognosis.—Delirium of collapse is not always favourable as regards prognosis. It is true that the great majority of cases make a satisfactory recovery; but the prognosis must depend upon the state of physical debility and the corresponding implication of the mental faculties. The prognosis therefore depends largely upon the severity of the primary affection. When that has been comparatively slight, as in pneumonia or influenza, recovery may be expected to occur rapidly and uninterruptedly. If, on the other hand, the affection is subsequent to such serious diseases as typhoid or typhus fever, the condition may extend over many months. When the temperature tends to rise, and the physical strength of the patient does not improve, the prognosis is very grave, and death may be expected to occur.

[1] Griesinger, "Mental Diseases," *New Syd. Soc. Transactions*, p. 181.

Treatment.—Dr. Weber [1] strongly recommended the use of opium in large and frequently repeated doses, combined with stimulants applied externally and administered internally. Graves and Griesinger also approve of the administration of opium. These authors consider that this drug allays the irritability of the nervous system, induces sleep, and accelerates the return of reason. They all concur in the opinion that opium is remarkably well borne by the patients, even when administered in large doses. Chaslin also recommends opium, but only in cases where there is extreme excitement. The indications for treatment in these cases are very distinct. The patients are recovering from acute physical disease, therefore their condition requires the same course of treatment as was adopted prior to the outbreak of the mental symptoms. Confinement to bed is absolutely necessary. It is also necessary to administer light and easily digestible kinds of food, such as milk, eggs, vegetable soups, and peptonised albumens. Whether or not alcoholic stimulants are required, must be judged of by the individual case, but in the majority of patients they will be found to be of great use. As anæmia is one of the prominent symptoms, the various preparations of iron should be administered. If opium is not given, it will be found necessary to treat the insomnia which is almost always present by means of such drugs as sulphonal, bromidia and trional.

(*b*) *Acute Primary Mental Confusion.*—This affection may be introduced by a preliminary stage, the symptoms of which correspond with those which usually precede acute idiopathic mental affections. These may be briefly enumerated as follows: Headache, capricious appetite, disordered digestion, troubled sleep, a feeling of lassitude, mental depression, accompanied by vague and indefinite fears of some impending calamity.

Mental Symptoms.—The outbreak of the affection may be sudden, and may take the form of mental excitement, either of the melancholic or of the maniacal type. In a few cases the patient may present the symptoms of mental stupor. When the disease has assumed its complete form, that which

[1] Weber, *loc. cit.*

strikes the observer is the peculiar appearance of the patient. The expression is dull, stupid, and unemotional; the face is pale, of a grey leaden colour, as of one suffering from some serious constitutional illness; the outward appearance of the patient is one of extreme carelessness and disarrangement; the hair and clothing are disordered, and the attitude regardless and indifferent. It is often impossible to attract the attention by ordinary means, and the responses of the patient are casual and irrelevant. As a rule the patients are not loquacious, except when in a state of great mental excitement; but when they do speak, their language is incoherent. The same description applies to their actions, which are aimless, automatic, and generally absurd. Most of the patients are impulsive, and may suddenly react in a violent manner without any previous warning, as for instance by assaulting those around them, precipitating themselves through a window, or violently upon the floor, or by wantonly destroying some article in their immediate vicinity.

Uncertainty as to the next action of the patient is one of the characteristic symptoms in many of the cases. They may take their food for several days in succession, and then suddenly refuse it; they may be docile, and then suddenly become resistive and troublesome; or they may exhibit mental depression, which may then be suddenly transformed into mental exaltation. Most of the patients have hallucinations of hearing, accompanied by delusions of persecution and of self-accusation. In other cases the hallucinations of hearing are accompanied by a mild form of maniacal excitement.

In all cases there is a more or less profound affection of memory, and the patients are oblivious of their surroundings, and of past events, of which in health they retain a perfect recollection. This failure of memory is accompanied by, and is probably due to, the mental enfeeblement from which all the cases suffer.

Physical Symptoms.—The physical symptoms of acute confusional insanity are characterised by weakness and loss of nervous tone. The face is pale; the pupils are dilated; and the tongue is covered by a thin coating of white fur. There are various disorders of digestion, and constipation

alternates with diarrhœa. The organic functions of respiration and circulation are not performed with the same vigour as in health and strength. The temperature, as a rule, is normal. The secretion of the skin is altered, an oily, sebaceous excretion, different from the normal, healthy transpiration, being present. Sleep is disturbed, there being either a condition of complete insomnia, or sleep at irregular intervals, disturbed by dreams. The reflexes are always exaggerated. Some of these cases present the distinguishing feature of a tendency at certain periods in the course of the disease to become cataleptic. It is on this account that they appear to correspond so closely with the following group of stupor. In all the cases there is well-marked malnutrition, with a strong tendency towards emaciation.

Ætiology.—This affection occurs most frequently in those hereditarily predisposed to insanity, and particularly in young persons of either sex who are physically weak, and in whom the resistance of the nervous system is feeble. The proximate exciting cause is, however, almost always malnutrition from any cause, loss of weight and nervous tone, which may be due to anæmia, sexual excess, overwork, shock, or prolonged worry of any kind.

Course and Prognosis.—The course of the disease is extremely variable, and the prognosis ought to be guarded. When recovery takes place, it is usually preceded by a term of mental enfeeblement. A certain proportion of the cases become chronic, and many end in dementia, in which state the incoherence of ideas and of speech persists and stamps this form of dementia as being secondary to mental confusion.

When death takes place, it is either due to exhaustion, after an acute exacerbation, or to general atony and marasmus, or to some intercurrent affection, such as pneumonia, phthisis pulmonalis, or similar acute diseases.

Sauze affirms that when recovery takes place in these cases, it is preceded by a crisis, which takes the form of abundant sweating, salivation, and diarrhœa, while Schüle has described an eruption of boils on the skin.

(*c*) *Stupor.*—Great confusion exists among writers on mental diseases regarding the clinical divisions of this affec-

tion. Dr. Hayes Newington,[1] in 1874, divided stupor into two forms:—(1) Anergic, or the type of acute dementia, (2) delusional or the melancholic type. Clouston agrees with this division. Schüle[2] gives two primitive divisions:—(1) Acute primary dementia with stupor, (2) primary dementia without stupor. These forms he after subdivides into varieties. Dagonet[3] gives three divisions:—(1) Stupidité, (2) stupidité psycho-asthénique, (3) stupeur cataleptiforme. All these authors describe secondary forms of stupor, which are symptomatic of other diseases; but as symptomatic forms have no place in the present description, they have not been mentioned. Chaslin,[4] under the title of "Démence Aiguë," describes only one form of stupor, with two degrees of intensity. As Chaslin's description appears to me to be the most scientific, it is the one which, with some reservations, I now proceed to describe.

In *Stupor of the first degree*, the mental confusion is intense; the patient is immobile; the eyes are fixed; the face is pale; and the expression is that of profound hebetude, without any show of emotion. The patient remains seated in whatever position he may chance to occupy. The extremities are cold, blue, and somewhat swollen; the mouth, half open, allows the saliva to trickle out; catalepsy is pronounced, the patient allowing his limbs to remain temporarily in any position in which they are placed, but after a few seconds they are voluntarily brought back to a more comfortable position. Cutaneous sensibility is much diminished, as is also the sensibility to heat and cold. The gastro-intestinal disorders are well marked, and there is usually obstinate constipation. Interference with nutrition may be very profound, on account of the patient's indifference to food, and the faulty condition of digestion and assimilation. Respiration and circulation are both interfered with: the former is shallow, while the pulse beats exhibit a very weak state of the organs of circulation. The temperature of the body is below normal.

[1] Hayes Newington, *Journ. Ment. Science*, vol. xx. p. 362.
[2] Schüle, *Traité des Maladies Mentales* (French Translation), p. 198.
[3] Dagonet, *Traité des Maladies Mentales*, p. 328.
[4] Chaslin, *loc. cit.*

It is probable that sleep does not occur, although the patient lies motionless in bed all night.

The patient does not speak voluntarily, and it is only with great difficulty that answers to questions can be obtained from him. This irresponsive and immobile condition is frequently disturbed by an impulsive exhibition of violence and incoherent volubility, which only lasts for a few minutes, after which he relapses into the former condition of apparent unconsciousness. When after great difficulty the attention of the patient is temporarily arrested, his replies to questions, although usually irrelevant, show that he is by no means wholly oblivious to what is passing around him; and after recovery the memory for events occurring during the illness appears to be conserved to a certain extent.

It is almost impossible to arrive with any degree of certainty at the emotional condition of such patients; but many of them appear to labour under hallucinations and fixed delusions of a melancholic type. Occasionally these delusions are expressed. Some of them imagine that they are dead; others that they are being tortured; while others again have hypochondriacal delusions of an impossible and absurd nature. In a few cases the emotional condition would almost seem from the smiling of the patient and other signs to be of a pleasurable kind. It is probable that in the great majority of the cases the emotional condition is neutral. Notwithstanding this fact, however, the patients require to be watched, on account of the tendency that exists towards violent attacks on others or towards suicide. It is difficult to understand, in the presence of the mental symptoms enumerated above, how the patient in this condition of stupor can plan beforehand and carry into execution a deliberate act of suicide.

In *Stupor of the second degree*, which corresponds to Newington's Anergic Stupor, and to Dagonet's Stupeur cataleptiforme, the implication of consciousness and volition is much more intense. Memory seems to be in abeyance with regard to events occurring during the illness. There is no emotional condition whatever; the features are relaxed and expressionless; volition is almost entirely absent, and everything has to be done for the patient. When placed on a seat, he remains

there, and the cataleptoid fixity of the limbs is much greater than in the previous group. The reflexes are diminished, as is also sensation to external stimuli. According to Newington, these patients sleep well. The general bodily condition is lowered, and emaciation rapidly sets in. The habits of the patient are very dirty, and Newington states that "there is great decrease of vitality in the peripheral structures, as shown by a tendency to asthenic eruptions and to the production of vermin on the skin."

Kahlbaum has described under the name of Katatonia a mental affection characterised by a succession of different conditions, varying greatly in the different cases, consisting of melancholia, mania, stupor with catalepsy, mental confusion, and dementia. Any single one of these enumerated phases may be absent, and the phases appear to occur with a periodic alternation which is characteristic of many of the forms of constitutional mental affections. The existence of the entity "Katatonia" has with much reason been doubted by most modern writers, both French and German. The basis of the affection is confusional insanity (with the predominance of stuporose symptoms), various forms of which appear to occur successively in the same individual. The prognosis of Katatonia is always unfavourable.

Ætiology.—Stupor may arise suddenly after some exciting external cause, such as shock, fright, exhaustion following excesses or acute diseases, either mental or physical, or any other debilitating cause. Thus it frequently follows prolonged sexual excess, and occurs in several forms of mental disease, *e.g.* melancholia, mania, general paralysis, and severe epilepsy. It is probable that hereditary predisposition is present in nearly half the cases. It occurs most frequently in young adults. It very rarely forms along with mania one of the alternating phases of *Folie Circulaire.*

Course and Prognosis.—The duration of stupor is very variable. It may last for a few months or extend over a period of years. There is always a danger of death from pulmonary phthisis or from extreme inanition. Clouston[1] considers that the anergic form (stupor of the second degree)

[1] Clouston, *Mental Diseases*, p. 291.

is very curable, while about 50 per cent of the cases of the melancholic form (stupor of the first degree) recover.

Treatment.—The treatment of stupor may be formulated in two words—*supporting* and *stimulating*. Rest in bed, where that is possible, in the early stages, combined with the administration of a nourishing, liberal, and easily digested dietary, has usually a good effect. Iron, quinine, and strychnine, singly or combined, are of use in giving tone to the system, while digitalis and other cardiac tonics have been recommended for overcoming the cardiac weakness and vaso-motor paresis. When these measures fail, and the case becomes unduly prolonged, other and more active measures require to be adopted. Chief among these are electricity applied to the head and spine, the application of cold sponging, and cold douches. Dr. Alexander Robertson [1] has derived benefit from the application of cold water passing through a series of india-rubber coils, which were kept continuously applied to the head.

Pathology of the Confusional Insanities due to Exhaustion.—We have already reviewed at considerable length the various opinions regarding the influence of lowered nervous tone from any cause upon the nutrition of the body, the functions of its various glands, and the development of micro-organisms in the tissues (chap. iii. p. 53). It cannot, unfortunately, be said that any definite knowledge remains to us, and it must be admitted that the whole subject is at present somewhat chaotic; but there is every expectation that in the near future a positive pathology will crystallise itself from the host of facts and suggestions now in an incoherent condition.

The morbid histology of these affections is, however, somewhat more tangible than their humoral pathology. Sir John Batty Tuke,[2] discusses the changes in the neurons which result from fatigue. He states "the results of these observations, as recorded, are very fairly regular and uniform, and are to the effect that metabolic changes in nerve cells are as easy of demonstration microscopically as those of gland cells, and

[1] Robertson, Alex., *Journ. Mental Science*, vol. xxvi. p. 92.

[2] Batty Tuke, *Insanity of Over-exertion of the Brain*, pp. 31 *et seq.*

that they are of the same character; that in the nucleus, which is the seat of most active change after stimulation or normal fatigue, there is a marked decrease in size—a change from a smooth and rounded to a jagged, irregular outline, and loss of the open reticulated appearance, with a tendency to take on darker stains than the nucleus of the resting cell; and that in the cell protoplasm there is a slight shrinking in size . . . with decreased power of taking on stains . . . In the unstimulated cell the nucleus stains lighter than the protoplasm (of the cell): the first effect of stimulation is to reduce the staining of both to the same degree of intensity. As it is continued, the nucleus darkens, but remains lighter than the protoplasm; then the nucleus becomes distinctly darker, and begins to get deformed and crenated; and eventually a condition is produced which may be spoken of as collapse, nucleus and protoplasm losing all power of taking on stains. . . . It appears to me that the third stage may be regarded as the limit of functional activity changes . . . and it is interesting to observe how thoroughly the pabulum of a nerve cell may be used up and yet leave the organ in a condition admitting of reconstruction. The fourth stage appears to indicate a condition from which it is doubtful whether full recuperation can be obtained."

From these remarks, founded upon experimental changes produced in the nerve cells of the lower animals by electrical stimulation and fatigue, the transition is easy to the similar state of the cells in the brain cortex in the forms of confusional insanity under consideration. Tuke's description corresponds in all respects to the primary stages of chromatolysis, and as a matter of fact chromatolysis is found to be extensively present in the brains of those dying in the course of stupor, acute primary confusion, and the delirium of collapse. Dr. Wigglesworth [1] has made a careful histological examination of the brain in two cases dying of typical stupor. He found many of the cells globose in shape and increased in size. A large proportion of the cells presented a coarse granular appearance of their protoplasm, with eccentric position of the nuclei. At the time this paper was written

[1] Wigglesworth, *Journ. Mental Science*, Oct. 1883.

chromatolysis was not a known entity; but reading it in the light of our present knowledge we cannot fail to recognise from the description that the author was observing cells presenting typical signs of chromatolysis. Wigglesworth further remarks that the incidence of this cell affection was chiefly, though not exclusively, confined to the motor cells, and to the fronto-parietal regions. In the more chronic cases advanced chromatolysis with extensive cell destruction is common. While the recent cases do not, as a rule, present any marked naked eye appearances, still, in some of them, and in almost all the chronic cases, the following changes have been met with:—Slight adherence of the dura to the vertex of the skull cap, with increase in size of the Pacchionian bodies; wasting of the convolutions, with œdema into the pia arachnoid trabeculæ—sometimes the amount of fluid is considerable. The atrophy of convolutions, which is most probably due to destruction of neurons, is generally limited to the frontal and parietal lobes, but especially the former. The pia is opaque and thickened, chiefly over the region of the Sylvian fissure. The grey matter is pale and anæmic looking, and the whole cerebral substance soft and œdematous. Very frequently there is distention of the lateral ventricles, which contain an abnormal quantity of fluid. Kahlbaum, in his description of Katatonia, pointed out that in that affection the arachnoid was chiefly affected at the base of the brain, opacity and thickening of the membrane being most evident, especially in the portions of it extending from the pons to the chiasma and frontal lobes, and from the temporo-sphenoidal to the frontal lobes. He has also drawn attention to the diseased state of the arachnoid in the neighbourhood of the Sylvian fissure and of the second and third frontal gyri as explanations of the symptoms of verbigeration and dumbness so common in the disease.

Dr. J. R. Whitwell[1] has attempted to account for the pathological and clinical signs of stupor by the congenital diminished calibre of the blood-vessels. In several cases he found a condition of general arterial stenosis throughout the body, where all the arteries from the aorta upwards and down-

[1] Whitwell, *Journ. Ment. Sci.* October 1889.

wards were of markedly small size. He considers that this arterial defect may, in certain cases, have the effect of determining cerebral malnutrition (dystrophoneurosis) in predisposed cases under unfavourable conditions.

II. Forms resulting from Auto-Intoxication or from Microbic Toxins

(*a*) *Puerperal and other Insanities of Infective Origin.*— Although ordinary insanity may occur in predisposed persons during the period of pregnancy, after parturition, or during lactation, the forms of mental disorder which occur after parturition require to be discriminated. Those which occur within the first four or five days are almost invariably of infective origin; those which occur later, within the first six weeks after confinement, may be true manias or melancholias, although not a few of them belong to the confusional type. With regard to those which occur within the first week, it is generally possible to distinguish cases of infective origin from those which might more properly be classed under delirium of collapse, and which in their origin and course are analogous to post-operative insanity. Dr. J. Christian Simpson [1] states that the reason why post-operative insanity is so much more common in females than in males, depends upon the greater frequency of operations upon the female genital organs; and that if these operations are discounted, the percentage of cases of post-operative insanity will be found to be equal in both sexes.

Besides the infection of childbed, many other forms of infection are capable of setting up mental symptoms of an analogous kind. Thus, poisoned wounds, followed or not by extensive suppuration, the early toxic symptoms of virulent infectious diseases, such as typhus, diphtheria, or malignant scarlet fever, etc., may occasionally be accompanied by mental disturbance in all respects similar to infective puerperal insanity, the symptoms of which do not need a separate description.

Mental Symptoms. — In septic puerperal mania, the

[1] Christian Simpson, *loc. cit.*

symptoms occur within a very short time after delivery. There may or may not be preceding mental depression; but as a rule the disease reaches its climax very rapidly. The general character of the mental symptoms at the commencement is apathy and want of interest in surroundings; the patient does not wish to be troubled or disturbed, and her natural affection for her child is completely lost. Gradually she becomes talkative; she mistakes the identity of those around her; her ideas become incoherent, and her speech almost unintelligible. These cases are always afflicted with vivid hallucinations of sight and of hearing. To such an extent do hallucinations prevail that the patients lose touch with their ordinary environment and live in a world of phantasy. They are extremely restless and difficult to restrain, and their gestures are incessant and emphatic. As they tend to repeat the same words and sentences over and over again, accompanied by emphatic movements of their hands and arms, the gestures are also uniform and monotonous. At other times they are wild and aimless. Sleep is invariably disturbed, most of the patients having no natural sleep at all during the acute stage of the malady. There is a strong tendency to suicide and occasionally to homicide of an impulsive nature. As the disease advances, many of the patients manifest symptoms of stupor, which not unfrequently sets in as a definite stage preceding recovery.

Physical Symptoms.—The bodily symptoms are well marked and characteristic. The lochial discharge is either arrested or offensively fœtid, while the secretion of milk is stopped. At the very commencement of the disease there are usually rigors. The complexion is sallow; the tongue is tremulous and covered with a white fur; and the skin is moist and clammy. The temperature is usually about 100° F., and may rise to 103° F. or even more. Refusal of food is one of the most troublesome and dangerous symptoms of the disease, and is very common. The pulse is weak and rapid; the pupils are dilated; and the whole tone and appearance of the patient indicates extreme nervous prostration. The danger of pneumonia and of passive congestion of the lungs has always to be kept in view, as it renders the disease more critical as regards life.

The diagnosis of infective puerperal mania is usually easy. Its early occurrence after parturition, accompanied by rigors, its sudden onset, the heightened temperature, and the delirious incoherence of ideas are sufficient to distinguish the type.

Ætiology.—The infective origin of this affection is highly probable, although it is not likely that infection is caused by any specific organism. The subjects, as Dr. Savage remarks, are neurotic, and they seem to be predisposed to blood poisoning in virtue of their neurosis. Dr. Douglas[1] of Cupar, reporting a case of puerperal septicæmia, described the organism found in the blood, and which was presumably the cause of the affection, to be *streptococcus pyogenes aureus*. Jackman, quoted by Sir John Batty Tuke,[2] found the *micrococcus pneumoniæ crouposæ* in a case of acute puerperal mania. Haultain[3] found the *bacillus coli communis* only, in great numbers, in the blood and vaginal secretion of some cases of puerperal septicæmia. It is, however, rare to find a case of this disease which depends *solely* on septic causes. Most of the cases are primiparæ of a neurotic disposition, and according to Clouston, nearly 50 per cent of them are predisposed by heredity to insanity.

Prognosis.—The prognosis in these cases is better than might be expected; about 70 per cent recover, while less than 10 per cent die. Death occurs by the sinking of the patient into coma, by intercurrent diseases, such as pneumonia, or by increasing blood poisoning. After the subsidence of the acuter mental symptoms, a period of partial mental weakness, with or without stupor, often intervenes before absolute recovery.

Treatment.—The progress of the cases is so rapid that medical treatment is almost always subsidiary to skilled nursing. It is most important that the uterus and vagina should be carefully douched two or three times a day with warm antiseptic lotions. The feeding of the patients requires very careful attention, and as a rule alcoholic stimulants are

[1] Douglas, *Edin. Med. Journ.* (1897), vol. i. p. 413.
[2] Batty Tuke, *Edin. Med. Journ.* (1897), vol. i. p. 413.
[3] Haultain, *Edin. Med. Journ.* (1897), vol. ii. p. 131.

required in the weaker cases. The tendency to sleeplessness is extremely difficult to overcome, on account of the patient's unwillingness to take drugs. Morphia is generally unsuitable, although very serviceable in a few cases. Bromidia and sulphonal are, perhaps, the most serviceable hypnotics, although the latter has to be administered with great caution, on account of its tendency to produce, especially in females, hæmatoporphyrinuria.

(*b*) *Acute Delirious Mania.*—It frequently happens that cases of acute puerperal mania pass into the condition known as delirious mania, the "Manie Grave" of the French writers. On this account delirious mania is more common in females than in males. The fact of the connection of these two conditions in the manner mentioned is extremely suggestive of a common cause.

Mental Symptoms.—Acute delirious mania occurs between the ages of twenty and forty in persons previously debilitated, and who have undergone some nervous strain or shock, such as business worry, excesses, either alcoholic or sexual, or who have passed through the puerperal state. The outbreak of the disease is sudden, or may be preceded by a short period of mental confusion, during which the patients wander about aimlessly, and have the appearance of being intoxicated or suffering from some serious bodily malady. When the disease reaches its full development, there is a serious implication of ideation, often attended with incoherence of speech. Set phrases are automatically repeated over and over again, usually accompanied by gesticulatory movements. The emotional condition is negative, the mental obscuration clouding over all the ordinary psychical manifestations. The patients appear to labour under hallucinations of sight and hearing, which completely occupy all the faculty of attention that remains. There is great and continual motor restlessness of an aimless kind, although occasionally the patients attempt to escape and become violent in their conduct towards those in charge of them. As the disease advances, the patients become, in unfavourable cases, quite prostrated, and the movements become feeble; and finally they lapse into coma, from which they do not emerge.

Physical Symptoms.—The bodily symptoms show a profound alteration in nutrition; there is absolute insomnia, rapid emaciation; and the temperature generally stands above 100° F. In some cases there is hyperpyrexia. The pulse is frequent, compressible, and indicative of great enfeeblement. The patients are wholly indifferent to food; they may take it automatically, but frequently refuse it. The tongue is dry and, together with the teeth, covered with sordes. The patients are all indifferent to the calls of nature. In the more unfavourable cases there may be pin-point contraction of the pupil, strabismus, or convulsive movements of various muscles. It is asserted by Spitzka that there exists symmetrical atrophy of certain muscular groups. The tendon reflexes, at first exaggerated, become diminished in the later stages of the disease. The same writer also described profound vaso-motor paresis, which shows itself by the appearance of pemphigus on the extremities in some cases, and in others gangrene.

Prognosis.—The majority of the patients die, after an illness of a few weeks. Complete recovery never occurs, the patients being crippled, both mentally and physically, during the rest of their lives.

Ætiology.—This fatal disease occurs sometimes in predisposed persons as a consequence of profound physical prostration, malnutrition, and nervous exhaustion; but it is probably always due to invasion of the system by microbic toxins. Sir John Batty Tuke[1] describes an organism found in the urine and blood. Babcochi, quoted by Tuke, found in the cerebro-spinal fluid, prior to death, *micrococcus pneumoniæ crouposæ*, and *streptococcus pyogenes aureus*, the former in great numbers, the latter in scattered chains.

Treatment.—Treatment ought to be sustaining and stimulating, and should closely follow indications; but up till now no effective remedy has been suggested. Probably serum therapy may be found useful.

[1] Tuke, *Edin. Med. Journ.* (April 1897), p. 349.

CHAPTER XIII

CONFUSIONAL INSANITY—TOXIC INSANITY—*continued*

II. FORMS RESULTING FROM AUTO-INTOXICATION OR FROM MICROBIC TOXINS—*continued*

(*c*) *General Paralysis.*—General paralysis is a subacute inflammatory disease of the brain, occasionally extending to the spinal cord and the larger nerve trunks. It is characterised by the concomitant appearance of mental and physical symptoms. On the mental side there is progressive dementia, to which is generally superadded insanity of the maniacal, melancholic, or confusional type; on the physical side there is paresis and inco-ordination of certain parts of the motor mechanism, with partial degeneration of the osseous, cartilaginous, and muscular tissues.

The disease has been divided into three stages for purposes of clinical description, but the demarcation between the stages is artificial, and is not always recognisable in practice. In addition to the three stages, there falls to be described a prodromal period of indefinite duration and irregular symptoms.

General paralysis is a disease of middle life, the majority of the cases occurring between the ages of thirty-five and forty-five. From time to time we hear of cases occurring at a much earlier age, even in childhood and puberty; but such cases are so extremely rare that for purposes of clinical description they may be omitted altogether.

Prodromal Symptoms.—The physical symptoms of the prodromal stage may be altogether absent, and the first

notice of the disease may be the occurrence of an epileptiform convulsion. When a person has reached middle life without previously having manifested any distinct nervous symptoms, and when that person is suddenly seized with an epileptiform attack, the presumption is strongly in favour of the case developing into general paralysis. In the great majority of cases, however, changes in the character of the patient, as well as certain bodily symptoms, are observable by the people with whom he lives. The physical symptoms vary in each individual, but a few leading symptoms may be pointed out as common to most of the cases. The physiognomy of the patient changes; the face loses expression, and no longer accurately reflects, as in healthy activity, the working of the brain. There is a peculiar flattened appearance, with a dull leaden colour of the skin, which is highly characteristic. Some of the patients complain of obscure pains in the limbs and the chest, which are either rheumatic or nervous, or are associated with the degeneration which is known to be taking place in the bones and cartilages. Headache is a very common symptom and a very distressing one, and is usually felt in the frontal or vertical regions of the head. Some of the cases complain of girdle pains, as if a tight band were being drawn round the head or round the body, as in locomotor ataxia. Gastro-intestinal disorders, such as frequent biliousness, gastric crises, capricious appetite, and irregular action of the bowels, are very common. Finally, nervous symptoms, such as Jacksonian epilepsy, strabismus, tremors, and functional disorders of vision are frequently met with. Insomnia is generally present: sleep being either absent for longer or shorter periods, or irregular, or disturbed and unrefreshing. Lassitude and physical unfitness for exertion are invariably present. These symptoms at first show themselves when the subject is engaged in doing extra work or work to which he is unaccustomed; but they gradually extend to the usual avocations, which have to be abandoned altogether or imperfectly accomplished.

The mental symptoms are generally those which first attract the attention of other people. As a rule, the intelligence is unimpaired, although the patient himself is conscious

of defective energy and of various peculiarities which seriously attract his attention. Chief among these peculiarities are lapses of memory, mis-spelling of words when writing, omitting letters, or leaving words out of sentences. The chief change, however, is in the moral condition of the patient. At home he is irritable, loses his temper over trifles, and may be violent towards his relatives. Among strangers, on the other hand, he is facile, changeable, easily led into speculations of all kinds, or throws away his money upon useless objects. The prodromal stage may last for two or three years, or only for a few months.

First Stage.—When the disease has become fully established, it is, as a rule, easily recognisable from the presence of the mental and the bodily symptoms together. By the time the patient has entered upon the first stage, he has usually exhausted the patience of his friends, or directed towards himself the attention of the criminal authorities by committing some foolish act which leads to his removal to an asylum.

First Stage—Physical Symptoms. — The most prominent symptom is the embarrassment of speech. The first sign of the affection of speech is observed when the patient comes to pronounce a more than ordinarily difficult word. There is a hesitancy before attempting the difficulty, a bad attempt at pronunciation, followed often by a more successful repetition. Régis divides the speech into two kinds, the ataxic, consisting in a species of inco-ordination of speech, which is wandering, confused, precipitate, and full of mistakes, and the paralytic type, consisting in a staccato and sing-song slowness, with a tendency to syllable the words and part of the words. There are certain words which are used as tests and which appear to offer particular difficulty to the patients. Among them may be mentioned "conflagration," "British Constitution," "perambulator," "artillery," and "incompatibility."

This affection of speech depends upon inco-ordination of the innervation of the muscles of articulation. The patients are able to perform individual movements of the various parts of the organs of speech; but they are unable to co-ordinate them sufficiently to reproduce normal pronunciation. At the

same time there is a certain enfeeblement in the action of the special muscles, chiefly observable in a tremulousness of the voice.

Tremulousness of muscles is not confined to the muscles of facial expression or of articulation. It affects, besides the lips and the tongue, the muscles of the limbs, and is particularly noticeable in the more advanced stages of the disease. In the first stage the patients are able to write with a fairly steady hand; but they lose the power of performing the more skilled movements with the perfection to which they are accustomed. In those patients who are trained to skilled labour, such as artisans, painters, etc., the execution of the finer parts of their work is always imperfect, and although this may in part depend upon the mental condition, it is chiefly due to disorder of the finer co-ordination of the motor mechanism.

In the first stage of the disease the general bodily health is, as a rule, very good. Most of the patients labour under mild intellectual excitement, corresponding to simple mania. In consequence of this, their subjective sensations are usually vigorous and pleasant. The bodily functions are, therefore, performed normally and regularly; the patients eat well and sleep well. They, notwithstanding, present an exhausted and fatigued appearance, and they tend to lose flesh rapidly and to become anæmic.

First Stage—Mental Symptoms.—The mental symptoms of the first stage are, as has been indicated, characterised by a mild exaggeration of the normal functional activity of the brain. The patients closely resemble cases of simple mania in their expansive gaiety of manner and abandon; but they differ in not presenting the same vicious, selfish, and unsympathetic disposition. They are irritable, it is true, but they are very easily restored to normal equanimity. They bear no malice, are not revengeful, are usually generous, facile, and easily imposed upon. There is always present a certain amount of mental confusion, depending upon the underlying condition of commencing dementia or mental weakness, *which is the one invariable mental symptom in general paralysis.*

Delusions of grandeur are very common in this stage.

They usually take the form of extravagant ideas of self-importance, prowess, strength, or great wealth. They do not always exceed the bounds of possibility, and result conspicuously from the predominant state of mental exaltation. They are, therefore, generally indefinite. The patients refer to what they have done in exaggerated language, and to the possibility of what they may achieve in the future, but, except for effect, they very rarely embellish their statements with actual facts.

The insanity of the first stage may also take the form of melancholia, with resistance and refusal of food, of delusions of persecution and hallucinations of hearing, or of confusional insanity, or even of stupor. The latter forms are more common in the female than in the male, who usually exhibits an expansive mania.

Second Stage—Physical Symptoms.—This is essentially the stage of nervous disturbances. During the first stage it has been pointed out that there was a conspicuous loss of body-weight; in the second stage there is an increase in nutrition, the patients becoming stout and flabby-looking. At the same time the tremulousness of the muscles increases markedly. The embarrassment of speech becomes painfully apparent, accompanied by spasmodic twitchings of the lips and face when a difficult word or sentence is being uttered; the gait becomes ataxic, and the muscular inco-ordination increases to such an extent that simpler movements, such as tying knots or buttoning clothes, are clumsily executed. Towards the end of the second stage the simplest movements, such as walking and eating, are attended with considerable difficulty, on account of the muscular enfeeblement, the inco-ordination and the tremulousness of the limbs. At this time also the muscles of the pharynx become affected, so that deglutition is difficult, and there is great danger of the patient choking when swallowing such articles as crusts of bread or pieces of butcher meat, which are liable to stick in the pharynx and to press upon the trachea. The whole muscular system is implicated, probably from the very commencement of the disease.

The patients in this stage are liable to epileptiform seizurer, usually known as congestive attacks. At the com-

mencement of the disease, it has been pointed out that those seizures are of great diagnostic value when they occur. In this stage they occur with great frequency, and after each seizure there is a marked deterioration in the mental and physical symptoms of the patient. These attacks are multiform, and extremely various in their manifestations. They may closely resemble epileptic fits or Jacksonian epilepsy, being limited to one muscle or a small group of muscles. The patients may lose consciousness or not, and the fits may be solitary or may continue recurring with great frequency for several days. In other cases the seizures may take the form of apoplectic attacks, with or without convulsions, generally followed by transient paralysis of one or other part of the body. These apoplectiform seizures may be of a serious and alarming nature, or so slight as only to be noticeable by the fact that the patient allows some object, such as a spoon with which he is eating, to fall down without being able to pick it up again. There is generally, during the epileptiform seizures, especially when they are at all severe, a rapid rise of temperature, which is usually higher on the convulsed side of the body than on the other. This rise has been observed to extend to 105°, 106°, or even 109° F. Of course in the latter case death rapidly ensues.

Second Stage—Mental Symptoms.—The mental symptoms of the second stage are characterised by increasing dementia, and by an exaggeration of the insanity of the first stage. If the patient has been expansive and grandiose in his ideas in the first stage, he expresses fixed delusions of an absurd and extravagant nature in this stage. There is no limit to the variety or to the extent of the false ideas. These delusions are characterised by their improbability, and by the limitless extent to which the patients indulge their fancy. When the delusions take the form of wealth or grandeur, the patients may describe themselves as kings, princes, emperors, or as being omnipotent.

It not infrequently happens, however, that a change takes place in the mental state, whereby a patient who has been exalted and expansive in the first stage becomes depressed or hypochondriacal in the second stage, or *vice versâ*. These

alterations of the mental state occasionally take a circular form, the patients being alternately exalted and depressed throughout the active stage of the disease. Such changes are met with in the female sex, and in a minority of all cases, the general rule being that a case continues from commencement to finish in the same mental state.

The conduct of patients in the second stage is remarkable for uncertainty and foolishness. The patients lose their appreciation of what is going on around them; they commit absurd and childish acts, such as stealing useless articles, filling their pockets with rubbish, and repeating the same words and ideas over and over again without regard to relevancy. Again, the patients are apt to be untidy in their personal appearance, and they often lose all sense of propriety in their actions. Towards the end of this stage their habits become extremely faulty and unclean. Their desire for food is very great, and they eat it rapidly, without proper mastication, very much after the manner of a dog eating flesh. Consequently the danger of choking becomes enormously increased. Another symptom of the end of this stage is a movement of the jaws, somewhat like rumination, often attended with a grinding of the teeth of a very disagreeable kind.

Third Stage.—The transition from the second to the third stage is, as a rule, not well marked, although congestive seizures towards the end of the second stage may precipitate the condition, known as the terminal period of general paralysis.

Third Stage—Physical Symptoms.—The well-fed appearance which may be observed in the second stage is now replaced by one of exhaustion and emaciation. As the condition advances, the emaciation increases, until the patient ultimately becomes a living skeleton.

Muscular tremors and muscular inco-ordination also become much more marked. At first the patient is unable to walk without staggering, is unable to dress himself, or even to eat his food properly. He has then to be watched carefully on account of his tendency to fall when he attempts to rise from his seat. Finally, he has to be confined to bed, generally on the floor, so that he may not fall out and injure himself. The affection of speech is generally so pronounced

that patients who have reached this stage are hardly able to articulate at all, and towards the end of the stage are completely silent, except in some cases, where there is inarticulate shouting, especially at night. The habits of the patients become extremely faulty, and as a rule all control over the sphincters of the bladder and bowels is lost. In a few cases there is retention of urine, owing to an inability on the part of the muscular fibres of the bladder to contract.

Trophic changes usually set in shortly after the commencement of this stage. The most common of these are ordinary bed sores on the sacrum and femoral trochanters, where most pressure takes place in the contact between the body and the bedding. It is sometimes possible to prevent the occurrence of these bed sores by means of very careful nursing, and by keeping the patients clean and dry, often a most difficult task, for contact of urine with the skin undoubtedly aids in the formation of these sores. There are other cases, however, in which no precautions are of any avail, and where bed sores form at every possible point of contact—on the elbows, and even on the knees, which are only subjected to the weight of the bed covering. Besides bed sores, some patients are subject to erythemas, abscesses, perforating ulcers of the foot, and shedding of the nails and teeth, as well as to extensive sloughing of various parts of the body. The third stage generally terminates in a convulsive seizure, or a series of epileptiform attacks, or some pulmonary affection, such as pneumonia or gangrene of the lungs, or in inanition, or finally by implication of some of the vital centres in the medulla, either by extension thereto of the diseased process, or by toxic conditions of the blood.

Third Stage—Mental Symptoms.—The state of confusion which, as we have seen, gradually progresses throughout the second stage, reaches its acme until the patient finally becomes completely demented. The patients seem to be devoid of emotion, sentiment, or memory. Their ideas gradually become contracted, until finally they are either entirely abolished, or can be only momentarily reproduced reflexly. Their only remaining instinct is that for food, the human degradation having reached such a profound level that the patient actually

falls into the condition of a lower order of being, more resembling a vegetable with a digestive tube than an animal. Such are the leading symptoms which characterise the various stages of this disease. There are, however, some symptoms which, although usually present in a large number of cases of general paralysis, it is impossible to classify as belonging to any of the stages just described.

Remissions.—In many of the cases remissions in the insanity are observable from time to time, and it is then called remittent general paralysis. Along with the remission of the insanity, there is always observable an arrest in the progress of the physical symptoms; but there always remains the mental confusion or dementia, which varies according to the stage of the disease (usually the first or second) in which the remission takes place. The occurrence of remissions in the course of a case of general paralysis has generally the effect of prolonging the disease to double its usual length, sometimes to even ten or more years.

Hallucinations.—Hallucinations are supposed by some writers to be very common. Visual and auditory hallucinations predominate. As a rule these sensory disorders are irregular, changeable, and indefinite, although in hypochondriacal cases they are vivid, disagreeable, and more definite in character. Disorders of the sense of pain and touch, whether hallucinatory or, as is more probable, due to central or peripheral nerve lesions, are very common, especially towards the end of the second stage and during the third stage. In no other way can the distressing noises made by the patients who are unable to express themselves or to articulate, be explained.

Destructive Habits.—A tendency towards destruction of articles, especially of clothing and bed clothing, is very common between the middle of the second stage and during that part of the third stage in which the patient is able to use his hands. In the cases where this symptom is a predominant one, the patients during the day twist off the buttons of their clothes or otherwise destroy them, and they spend their nights in tearing their bed coverings into long ribbons, which they carefully knot together.

Sexual Excitement.—Sexual excitement, especially in males, is a very common symptom, and the great majority of such patients yield themselves unrestrainedly to habits of masturbation.

Reflexes.—The superficial skin reflexes are, as a rule, lowered or diminished. Great variety exists in the appearance of the tendon and deeper reflexes. Exaggeration of the knee jerk is most common, but in a considerable number of cases it is found to be normal. In a few cases there is a distinct difference in the reaction of the two sides. As a general rule, when the patellar reflexes are absent, the plantar reflexes are also either absent or diminished. In those cases in which there is locomotor ataxia, which are known as the tabetic or ascending forms of general paralysis, the knee jerk is absent on both sides.

Pupillary Anomalies.—The pupil reflexes are among the most constant and significant symptoms of this disease, although they vary considerably in different cases. As a general rule there is contraction of the pupils in the early stages, with gradual dilatation, increasing towards the later stages. The contraction of the pupil is constantly present in those cases in which there are tabetic symptoms. Inequality of the pupils is one of the most constant signs of the disease. The more dilated pupil is the affected one, the dilatation being due to paralytic mydriasis. It has been stated by some writers that dilatation of the right pupil is associated with melancholic mental symptoms, and that of the left with maniacal or expansive mental states. Irregular contour of one or both pupils is not infrequently met with. The irregularity usually takes the form of the upper arc being larger than the lower; but there is no limit to the irregularities of outline which may be observed. Another symptom is what is known as the Argyll-Robertson phenomenon, in which the pupil does not react to light, but reacts to accommodation. Occasionally, cases will be met with in which the pupils react neither to light nor to accommodation, and more frequent still are the cases in which they react with great sluggishness to all forms of stimuli. It is well to bear in mind that these pupillary symptoms are liable

to great variation, within very limited periods in the same case.

Sensory Disorders.—The senses of smell and taste are generally affected early in the course of the disease, and the affection progresses until the patients are unable to discriminate between very pronounced odours and tastes. Visual imperfections, colour blindness, and visual hyperæsthesia are met with in a small proportion of cases, while atrophy of the optic nerve occurs in many of the more advanced cases; but optic neuritis is not common, and the ophthalmoscopic appearances are not marked in the great majority of cases. With regard to anæsthesia, there is a frequent and progressive impairment of cutaneous sensibility, together with a loss of the feeling of pain, and of the thermal sense. These anæsthesias may be either general or limited. As a rule, they are most pronounced in the following order:—on the chest in front, in the lower limbs, the upper limbs, and the face and hands. Dr. Arrigo Giannone has described analgesia of the ulnar nerve as a diagnostic symptom of some importance in general paralysis. If the arm of the patient is flexed, and the ulnar nerve firmly pressed upon as it runs over the groove in the humerus, this authority states that pain will be absent in 53 per cent of cases of general paralysis, and that the sensation will be diminished in 25 per cent.

Trophic Changes.—There is a marked interference with the nutrition of the body. The nails become rough and fissured; the hair becomes dark, thin, and brittle; and the skin loses its healthy character and colour. There is a diminution in hæmoglobin, and in the number of red blood corpuscles. In a few cases there is progressive muscular atrophy, either general or limited to certain groups of muscles; the chief muscular changes, however, are those already described when dealing with the different stages of the affection. Bed sores have been already referred to. A very common symptom, and one which is not entirely confined to general paralysis, is what is known as hæmatoma auris or the insane ear. It usually begins in the fossa of the helix, or it may come on in a more diffuse form, affecting a large surface of the external ear. The affected portion is swollen and of a dull

red colour. There is a well-marked swelling, which may be so great as to conceal the natural form of the ear, and which gives an elastic feeling on pressure. The swelling may burst or suppurate or gradually resolve itself. In any case there is left behind a shrivelled and deformed ear. The degenerative change producing this phenomenon takes place in the ear cartilage and its vessels, and is probably excited by some external injuries. Other cartilages also occasionally suffer, such as those of the nose, the joints, and the ribs. There is, however, a more constant change in the cartilages of the sternum. The xyphoid portion of the sternum becomes ossified, elongated, and incurved towards the abdomen, so as sometimes to produce severe pain, while a slow process of periostosis, affecting the whole sternum, diminishes the elasticity of the thorax, which becomes immobile, and necessitates abdominal breathing.

Profound alteration takes place in the bones of the skeleton, which reveals itself in an obscure disintegration of the osseous structure, a loosening of the connections between the laminæ, and a general infiltration of oily matter into the osseous substance and into the Haversian canal. The inorganic constituents of the bone are reduced, and the organic increased; the ratio of lime to phosphoric acid is less than in healthy bones; and the composition approaches what is observed in osteomalacia. Consequently the bones become very brittle, and fracture is most liable to occur on the slightest occasion. Especially is this the case with the ribs, where the cartilage of the sternum loses its resiliency, while the bony structure of the ribs is less resistive.

Body Temperature.—The temperature of the body is liable to considerable variation in general paralysis so as to make it impossible to lay down any fast rule for guidance. In the writer's experience the most common change is an evening rise of 1° F., which may, apart from intercurrent disturbances, persist continuously. More usually, however, this evening rise is subject to frequent intermissions of from one to two weeks' duration during the course of the disease.

Ætiology—Predisposing Causes.—General paralysis is essentially a disease of modern civilisation. There is no trace in the writings of the older physicians which would

lead us to infer that the disease was recognised prior to the commencement of the nineteenth century. It is most prevalent in the busy centres of civilisation, and is almost unknown in isolated rural districts. It may be generally stated that the disease does not exist in the Highlands of Scotland, or in Ireland outside of the larger cities, or in the more rural and remote districts of Wales and the South of England. It reaches its maximum in the busy manufacturing towns of the Midlands, and in the larger cities of the United Kingdom. Taking a wider geographical area, it is most prevalent in the countries of Western Europe and North America, and is practically unknown among the uncivilised nations of the world.

It occurs, as has already been stated, most commonly between the ages of forty and fifty years, just after the brain and nervous tissues have reached their maximum development and their limit of nutritive change. According to Mickle,[1] who is the great English authority on the subject, it appears that the average age of occurrence is being gradually decreased, and that it now stands about thirty-eight years, which this writer considers as a bad sign of the vitality of the population of Western Europe, inasmuch as general paralysis is to be regarded as the result of an extreme waste of vital force and of premature senility. As has already been mentioned, cases have been recently recorded of the occurrence of the disease at a very much earlier age. On the other hand, there are numerous recorded cases occurring after the age of sixty or sixty-five years. Such cases are usually described as senile or atheromatous paralysis.

With regard to heredity, there is much divergence of opinion; but it is generally admitted that in general paralysis there is no special heredity to the psychoses. On the other hand, there is usually to be discovered a distinct hereditary history of the diatheses and of nervous diseases, especially of congestive forms of brain diseases, such as atheroma, apoplexy, and cerebral softening.

This disease is much more prevalent in the male sex. According to Régis, Christian, and Ritti, among the insane

[1] Mickle, *General Paralysis of the Insane*, p. 250.

drawn from the populations highly predisposed to general paralysis, about 30 per cent of the males were general paralytics, while only 5 per cent of the females suffered from this disease. It is, however, generally agreed upon by all authorities on the subject that there is at the present time a growing tendency on the part of the female sex to be affected with general paralysis.

General paralysis affects all classes of the community, and all trades and professions. It appears to have a special selection for those who work hard, and who, at the same time, on account of dissipation or other reasons, do not allow themselves sufficient rest to recuperate their exhausted nervous system.

Exciting Causes.—General paralysis may be either primary or consecutive to some other affection of the nervous system, especially locomotor ataxia. When it succeeds locomotor ataxia, it is known as ascending general paralysis. On the other hand, locomotor ataxia frequently succeeds the appearance of general paralysis in the brain, while other cases present throughout their whole course a combination of the symptoms of the two diseases. Locomotor ataxia is in many respects the analogue in the postero-lateral column of the cord of general paralysis in the brain cortex. This intimate connection between the two diseases is further illustrated by their common origin. According to Fournier,[1] Vulpian,[2] Erb,[3] and Ross,[4] syphilis is the most frequent and most important factor in the causation of locomotor ataxia. These authorities state that locomotor ataxia follows syphilis in from 89 to 91 per cent of all cases. If we turn now to general paralysis, modern authorities are agreed that syphilis is one of the most potent factors in the causation of that disease. According to Kraepelin,[5] persons affected with syphilis are sixteen times as liable to general paralysis as non-infected persons, while he places the percentage of cases known to have been syphilitic at 75-86 per cent. Régis[6] and Bonnet state the same figures at from 70 to 90

[1] Fournier, *De l'Ataxie locomotrice*, p. 15.
[2] Vulpian, *Leçons sur les maladies du système nerveux*, p. 245.
[3] Erb, *Trans. Intern. Med. Cong.* p. 32.
[4] Ross, *Diseases of the Nervous System*, vol. ii. p. 8.
[5] Kraepelin, *Psychiatrie* (1899), Part II. p. 286.
[6] Régis, *Mental Medicine*, p. 459.

cases out of 100. The difficulty of tracing a history of syphilis is in many cases well known. The patient may suffer from hereditary syphilis, or he may persistently deny the existence of acquired syphilis, or on the other hand he may be ignorant of his infection. If we can therefore rely upon the figures quoted above, and upon those of many other authorities which have not been quoted, we may accept the fact that in the great majority of cases, general paralysis is a para-syphilitic disease. Observe I do not say a "syphilitic" disease. If general paralysis were a manifestation of syphilis, its treatment by anti-syphilitic remedies would probably be more successful. As it is, it never or almost never responds to any form of medication. In the majority of cases the syphilitic infection occurs from ten to twenty years prior to the appearance of general paralysis, and long after the active signs of syphilis have left the system. It is probable, however, that the syphilitic toxin has induced a degenerative change in the nervous system, which slowly advances, and which, when it acquires ascendency, produces auto-intoxication, either directly or indirectly, through an interference with nutrition. Apart from syphilis, which is the preponderating exciting cause, it is generally believed that general paralysis may be produced by toxic agents used in excess, such as alcohol and tobacco, by lead poisoning, by mental overstrain, and by sexual excesses. As a rule, general paralysis does not affect people who suffer from other neuroses, such as hysteria, neurasthenia, or epilepsy. There seems to be a special antagonism between these affections and that disease.

Duration and Termination.—General paralysis is the most fatal disease from which a human being can suffer, for no authentic case has ever been known to recover. There is a group of affections known as pseudo-general paralyses, which bear the same resemblance to that disease as the pseudo-tabetic forms and other pseudo-spinal affections bear to the true systemic disease of the cord. The differential diagnosis is almost impossible, the only proof of the pseudo character of the affection being the fact that the patients recover. The usual duration of general paralysis is from two to three years in the male, and from three to four years in the female. The

disease is progressive, and except in the rare cases in which the insanity is of the remittent type, the termination usually occurs at the end of three or four years in all cases.

Treatment.—In such a fatal disease as general paralysis treatment must be devoted to the amelioration of the symptoms and to the careful watching of the patient. In the earlier stages of the disease it is almost always necessary to put the patients under supervision, either in an asylum, or by other means, in order to prevent them from committing criminal or absurd and foolish actions. Medicinal treatment has hitherto not been successful in relieving the symptoms, even anti-syphilitic treatment being unfortunately almost without any decided effect. In the treatment of the insanity the same general principles must be adopted which have already been described as efficacious in the relief of mania, of melancholia, or of stupor. So far as hypnotics are concerned, I have found paraldehyde to be very efficacious, and to be free from the objection on account of its taste which every other class of patient raises against it. The congestive attacks must be treated in the same way as epileptic seizures, and when they tend to recur in the form of the status epilepticus, chloral hydrate, administered by the bowel, will be found, as in epilepsy, to be very efficacious. Chloroform may also be administered.

The Pathology and Morbid Histology of Puerperal Insanity, of Acute Delirious Mania, and of General Paralysis

The fundamental fact in the pathology of the above affections is the change produced in the structure of the nervous system by the circulation of toxins in the blood. With this fact the clinical symptoms of the diseases are in complete accord. In puerperal mania and in acute delirious mania the course of the malady is so rapid and the changes in the nerve cells are so marked that there can be very little doubt that the toxins are primarily of microbic origin. Micro-organisms have repeatedly been found in the blood and urine, but that these organisms are directly causative of the histological

alterations found after death has not yet been conclusively established. In all three groups of affections changes of a necrotic kind have been observed in the renal epithelium, especially that lining the convoluted tubules and glomeruli, which are usually characteristic of the action of toxins. We are, therefore, from the clinical and pathological, and as we shall see presently, from the histological standpoint, fully justified in grouping together these three affections as being of toxic origin. With regard to morbid histology, the description must be divided so as to differentiate those diseases in which the poisoning process is acute and rapid—a few weeks, as in puerperal mania and acute delirious mania—from that in which it is somewhat less acute and slower—three to four years, as in general paralysis.

(1) Taking the more rapid process first, we shall begin with acute delirious mania, as being typical of acute and extreme intoxication of the nervous system. The poisoning of the nervous system in this affection is not limited to the cerebral cortex alone, but extends simultaneously to the pons cerebellum and the spinal cord, especially its anterior root columns. In the cortex the cells of all the layers are found affected, but in varying degrees of intensity, only a few cells escaping the disease process altogether. Andrea Cristiani [1] has observed, with the use of Nissl's method, that chromatolysis commences at the periphery and marginal zone of the cell. This is in accordance with Marinesco's [2] experiments upon animals, in which he found that acute and subacute poisoning produced a chromatolysis commencing at the periphery of the cells. The chromatic elements become less abundant, stain more faintly, and have a tendency to become granular. As the process advances, the chromatolysis spreads inwards from the margin of the cell towards the nucleus. The latter becomes eccentric, and finally bursts through the cell wall, becomes tumid, indistinct, and shows a pale, indistinctly-stained nucleolus. The cell, with its nucleus and nucleolus, then becomes deformed, tumid, then shrivelled, and finally

[1] Andrea Cristiani, *Rivista di Psicol. Psich. Neuropat.*, Roma, June 15, 1898.

[2] From Goldscheider and Flatau, *Anat. der Nervenzellen*, p. 63. *Vide* also Marinesco, "Path. de la cellule nerveux," *Proc. Inter. Cong. at Moscow*, Paris, 1897.

blurred and indistinct. Sometimes yellow pigment is observed in the interior of the cell, with chromatolysis of the margin, or pigment collected at one extremity and chromatolytic changes at the other. Finally, the cell is reduced to a granular unrecognisable mass, with complete or partial disappearance of the processes. Not infrequently the only trace of the position of the cell is the presence of darkly-stained leucocytes in the pericellular lymph space, which escape into the empty space left by the cell. The debris of the cell destruction is, however, in the short disease process hardly ever completely removed. With the aid of Golgi's silver method, the alteration in the protoplasmic processes is clearly seen. The branches lose their uniform fine, mossy appearance, and they present various beadlike formations at frequent intervals. Many of the cell processes are broken off, stunted, and fractured-looking. The Nissl and Golgi methods, when used together, enable us to see more comprehensively the extensive degeneration of neurons which takes place in the cerebral cortex, more especially in the Rolandic area and the frontal convolutions, whole tracts of cortical territory being completely swept of all their neurons. The finer medullated and non-medullated fibres of the cortex, especially those lying more superficially and under the pia, are implicated severely. The non-medullated fibres are broken and atrophied, while the medullated become enlarged, flattened out or irregularly expanded into fusiform swellings, which give them a beaded, rosary-like appearance, due to the running together of the myelin. In some of the more external parts of the cortex the nerve fibres may be observed completely destroyed and indistinguishable. The same changes in nerve fibres, though to a less extent, are found in the pons, medulla, spinal cord, and some of the larger nerve trunks.

The cells of the cerebellar cortex and of the anterior horns of the spinal cord are also affected, but the chief incidence of the disease action, as already stated, is upon the cortex of the forebrain. The blood-vessels of the cerebral cortex do not show any marked change. Many of them are filled with red corpuscles; in a few instances there is nuclear infiltration of the adventitia, and there is to be observed diapedisis of

leucocytes through the vessel walls into the perivascular spaces, but not to any great extent. As a rule, however, the vessel walls are neither thickened, nor tortuous, nor degenerated. There is no marked increase in the number or size of the neuroglia elements, except perhaps immediately underneath the pia and in the neighbourhood of degenerated cells; but the condition of the neuroglia cannot be compared with that seen in general paralysis or some of the chronic forms of insanity. The meninges of the brain and spinal cord, beyond slight congestion or ecchymotic patches, are not pathologically affected.

With regard to infective and puerperal mania and other similar forms, it may be generally remarked that the histological changes are qualitatively similar, though less extensive and less intense than those just described. I have said that some cases of toxic mania pass into a condition in all respects similar to acute delirious mania. In one such case which I examined histologically I could not find one healthy cell in the portions of cerebral cortex observed, and in several sections there was complete destruction of all the cells, with profound implication of the processes and of the nerve fibres. While these cases are identical in their morbid histology with delirious mania, the ordinary infective puerperal mania is a much less grave affection. Chromatolysis exists very extensively, but in the great majority of cells the process does not proceed beyond the possibility of repair, the nerve fibres are not destroyed to the same extent as in the serious forms, and the disease action does not extend—so far as is at present known—with any great severity to the lower brain centres and the spinal cord.

(2) General paralysis presents in many respects a similar pathological histology to the infective forms above mentioned. Although micro-organisms of various kinds have been found in the cerebro-spinal fluid in this disease, there is no reason to suppose that it is an affection of microbic origin. Drs. Montesano Giuseppe [1] and Montessori Maria [1] made a bacteriological examination of the cerebro-spinal fluid in eleven cases

[1] Giuseppe and Maria, *Riv. Quin. di Psicol. Psich. Neuropatol.*, Roma, December, 1897.

of general paralysis. In eight of the cases micro-organisms were found in the following order of frequency: (1) *Bacillus Viscosus*, four times; (2) *streptococci*, three times; (3) *staphylococci* and *sarcinæ*, four times; (4) *bacillus* of *tetanus*. On the contrary, as has been indicated in the portion devoted to its ætiology and in the chapter on Determining Causes (p. 71), general paralysis is more likely to be due to toxins, the result of auto-intoxication from previous infection of the system by syphilis or other poisons. The intoxication of the nervous system in general paralysis, although rapid and severe, is less so than in acute delirious mania or the puerperal group, and consequently the secondary changes, especially apparent in the blood-vessels, meninges, and neuroglia elements, are very pronounced, forming indeed a prominent part in the morbid histological appearances. Moreover, the comparative slowness of the process in general paralysis produces to a certain extent secondary nervous degeneration of nerve fibres and centres, a process which in the more rapid forms of intoxication is impossible.

In 1882 Tüczek [1] called attention to the early destruction of the tangential nervous fibres lying immediately underneath the pia. After these the next to disappear were the more superficially lying transverse fibres passing between the bundles of radially coursing fibres, and finally the radiating fibres themselves were involved, first of all in the more superficially lying parts. Tüczek looked upon this fibre implication as the early and essentially the first pathological change in general paralysis. Around this observation a controversy of great interest arose, which in the light of the more modern toxic theory of origin of the disease appears not only superfluous but misleading. Mendel [2] disputed Tüczek's views, because he held along with Bevan Lewis that the disease was of primarily vascular origin. Looking at the question impartially, we must admit that the atrophy and destruction of the finer fibres of the cortex is probably a very early change, but the question of its precedence is, if not meaningless, at any rate unimportant, when we consider the almost con-

[1] Tüczek, *Beiträge zur path. Anat. der Dementia paralytica*, 1884.

[2] Mendel, *Proceedings Inter. Med. Congress*, Berlin, 1891.

temporaneous implication of the cortical elements, nervous and non-nervous. In acute delirious mania we saw a similar degeneration of the finer cortical fibres.

The cortical neurons are probably the first to suffer in this disease from chromatolysis. The process is more or less limited to the Rolandic area and the frontal lobes, and is usually more severe in one hemisphere. But almost the whole cortex may be implicated in some cases with special incidence upon the sensory or motor or frontal regions. The frontal regions probably never escape chromatolysis. Chromatolysis in the early stages of the disease is very irregular, not only as regards cortical areas, but as regards the various layers of cells and individual cells. At any rate with the methods presently at our disposal we find, side by side, cells apparently healthy, cells slightly degenerated, and cells in an advanced stage of degeneration. The large motor cells in the ascending frontal, ascending parietal, and the posterior extremities of the three frontal convolutions are particularly liable to degeneration, and show it early.

A contemporaneously early change is observed in the blood-vessels of the pia. According to Bevan Lewis, the initial vascular derangements are the first to be noted in general paralysis. The pial vessels become distended and tortuous, and their *adventitia* shows a large increase in nucleated protoplasmic cells. The meninges, beyond a slight tendency to thickening and opacity of the pia-arachnoid, and a slight adhesion (in some cases) of the pia to the vertex of the convolutions, do not show any marked change in the first or earlier stages of the disease.

The neuroglia elements underneath the pia (Deiter's cells) enlarge and proliferate and send branches deeply into the first layer of the cortex.

In a more advanced stage of the disease, say, the commencement of the second stage, much more decided changes are met with. Chromatolysis of the cells is more extensive and more severe. Groups of cells all over the cortex, but especially "motor" cells, are found in every stage of degeneration, as has already been described.

The blood-vessels become more distended owing to vaso-

motor paresis of their muscular coat; they are very tortuous, and freely permit of the diapedisis of leucocytes into the perivascular canals, which further impedes the course of circulation. This change is found chiefly on the vertex of the fronto-parietal regions, and seldom extends to the base or to the occipital lobes.

The meninges become more opaque and cloudy, especially over the course of the veins in the sulci. The pia-arachnoid trabeculæ become filled with a fluid exudate, which gives to the naked eye appearance of the cortex that streaky opalescent look which is so characteristic of the disease. As the disease advances, this "water-logging" of the membranes increases owing to the shrinking of the convolutions, due to destruction of nerve cells and the necessity for compensatory fluid to replace vacuum, which is so easily obtainable through the diseased walls of the blood-vessels.

The walls of the vessels also permit of the exudation of blood, which gives rise to the special effusion most common in, though not limited to, this disease, known as pacchymeningitis hæmorrhagica interna. This effusion of blood, which may vary greatly in extent, thickness, structure, and appearance, is found either between the dura and arachnoid, or in the subarachnoid space. When in the subdural space, the hæmorrhage is due to proliferative and degenerative changes occurring in the endothelium of the inner surface of that membrane, and in its perivascular canals, in consequence of which the vessels become compressed and obliterated. New capillaries are speedily formed, from which hæmorrhage readily takes place. There may also occur oozing of blood under similar conditions from the outer surface of the arachnoid. When the clots thus formed vascularise, a regular sac formation may result, an organised membrane lining the inner surface of the dura, and another the outer surface of the arachnoid, while between the two a broken-down, semi-fluid, red clot is encysted. Within the cortex itself aneurysmal dilatations of the diseased vessels are very common. These may burst, causing wide dilatations of perivascular canals, and the extravasation of hœmatoidin crystals over large areas of the surrounding tissue, especially in the neighbourhood of degenerating cells.

The blocking of the perivascular channels caused by the exudation of leucocytes and by the proliferation and enormous production of protoplasmic masses on their walls, and the tortuosity and changes in the walls of the blood-vessels directly affect the nutrition of the nerve cells. Their degeneration in the more advanced stages of the disease, owing to this superadded cause, becomes more marked and greatly increased.

In the second and third stages of the disease there is a marked increase in the number and size of the neuroglia elements. Ford Robertson[1] asserts that in about two-thirds of all cases, excepting the subpial increase of Deiter's cells, there is no marked change in the neuroglia. This statement is open to question, because its author does not give the extent of the cortical implication in his cases. It may be generally asserted that neuroglia hypertrophy and hyperplasia accompany the course of the severer disease process in the cortex in general paralysis. It is always found more extensive underneath the portions of affected membrane (pia) in the neighbourhood of degenerated cells and in connection with deformed blood vessels. In the latter connection large neuroglia cells are constantly found attached by an hypertrophied process, with a sucker-like ending to the vessel walls. They are also found among the fibres in the white matter, especially in that part of it immediately underneath the grey matter, in considerable abundance in some cases.

Implication of the mid brain and spinal cord varies in different cases. The nerve nuclei in the pons probably always suffer to a greater or less extent. Bechterew[2] examined the pons and medulla with the following result. In the medulla oblongata and in the pons he found the whole regions of the formatio reticularis (with the exception of the root fibres) of the central tegmental paths, the intervening olivary regions, the lemniscus, and the trapezoid body totally degenerated. Both pyramids and a considerable portion of the fibres of the restiform body, with the exception of the fibres between

[1] Ford Robertson, *Edin. Hosp. Reports*, vol. v. p. 262.

[2] Bechterew, *Centralbl. f. Nervenh. u. Psych.*, Coblentz and Leipzig, Sept. 1898.

the olivary body and the cerebellum, were also much degenerated.

The spinal cord is variously affected in general paralysis. Bevan Lewis [1] groups the cord cases into four arbitrary divisions, as follows:—(1) In the great majority of cases the spinal symptoms are indefinite, consisting of diminished cutaneous sensibility and sluggish knee jerks. After a congestive attack there is, however, increased knee jerk. Later on in the disease paretic symptoms may predominate, but the cerebral implication throughout is always the more emphasised. (2) The tabetic group, with all the symptoms of tabes dorsalis. Yet he points out truly that in some of the cases the special tabetic symptoms pass off and that the anæsthesia and ataxia may even be replaced by spastic paraplegia. (3) The group of spastic cases in which symmetrical descending sclerosis of the lateral columns is early apparent and continues. (4) The group of cases in which no special symptoms whatever are observable.

In considering the various implications of the cord the truer view is to look upon them, not as descending or ascending systemic affections, though, to a limited extent, that may be so, but as general diffuse affections depending upon the universal poisoning of the whole nervous system and its accessories by the toxins which permeate it through the circulation.

[1] Bevan Lewis, *loc. cit.* p. 502.

CHAPTER XIV

CONFUSIONAL INSANITY—TOXIC INSANITY—*continued*

II. FORMS RESULTING FROM AUTO-INTOXICATION OR FROM MICROBIC TOXINS—*continued*

(*d*) *Cretinism.*—Cretinism is a degeneration, occurring almost exclusively in certain localities, and characterised by an abnormal development, arrested or exaggerated, of different parts of the body, by a disproportion in the physical conformation, and by a varying degree of mental enfeeblement. The disease is met with in widely different regions, as regards climate, elevation, and geological formation. It is endemic in certain narrow valleys of the Alps, the Pyrenees, the Tyrol, and in some mountainous parts of Scotland. These valleys are contracted, humid, and shaded from the light and the sun. Cretinism is caused by some deleterious miasmatic condition still unknown, but which appears to arise in clayey, chalky, or alluvial soils. The miasmatic emanations exercise a poisonous influence upon the growing organism, especially upon the nervous system, whose development is arrested; but it also reacts on the whole constitution. Its effects are observable on the whole population of the affected district, but it selects for its injurious influence infants who are predisposed by heredity to mental and nervous affections. Its action is favoured by personal disregard of cleanliness, by absence of sunlight and of fresh air, by damp houses, by insufficient or unsuitable food, by debilitating affections, and, according to some writers, by the absence of iodine in the water. The more the infant is predisposed by heredity to nervous disease,

the greater is the influence of the miasma upon it, and the more it is exposed to the conditions just mentioned, the greater the effect of the poison. If hereditarily predisposed children at an early period are removed from the influence of their surroundings and properly fed, cared for, and educated, they generally throw off the tendency to eretinism.

The invariable accompaniment of this condition is an affection, generally an hypertrophy, of the thyroid gland. Cretinism and goitre are, however, not identical conditions; for although goitre is generally observed in districts in which cretinism is endemic, yet cretinism does not always exist in places where goitre is prevalent. Goitre is generally met with in localities where the drinking water is impregnated with some organic constituents, as where it flows over alluvial soil, or in the water of wells where impregnation by impure matter is possible. But whatever the relation between goitre and cretinism, there can be no doubt that pathological conditions of the thyroid gland stand in a causative relation to myxœdema, eretinism, and goitre.

Cretinism is always accompanied by mental enfeeblement, depending upon an arrest in the development of the higher nerve centres, and the degree of mental enfeeblement is usually proportional to the malformation of the skeleton, especially of the cranial bones. When in addition to the condition of cretinism there exists hydrocephalism, microcephalism, or accidental conditions due to cranial injuries or fevers, the degree of idiocy met with is always complete and extreme. When, on the other hand, the condition is not accompanied by accidental complications or cranial malformations, the mental enfeeblement is usually slighter.

Cretinism has been divided into three degrees for purposes of description, as follows:—(1) cretinoids; (2) semi-cretins; (3) cretins. These divisions, however, are artificial, and may be disregarded. Bearing always in mind that the condition varies from very slight mental enfeeblement, with not very marked physical characteristics, up to mindless idiocy, with all the stigmata of physical degeneration, an average may be struck, and the following description given of its mental and physical characteristics.

Mental Symptoms.—The intellectual faculties are limited, as in idiocy. There is a difficulty in learning to read, in articulating words, and in expressing ideas; the words are accompanied by exaggerated and ungainly gestures. The emotional condition varies considerably; at times the subjects are dull, stupid, and indifferent to their surroundings; at other times they are passionate, excitable, and easily roused to anger. Like idiots and imbeciles, they are guided chiefly by their instincts, and not by reason. They are susceptible of a certain amount of training, chiefly in matters of dress and behaviour. Their affections are not deep, but they are capable of forming attachments to those around them. They are all extremely indolent, and afflicted with lassitude and a desire for leisure. A few of them are capable of being taught writing and music. Most of them are somnolent and have a tendency to sleep almost continuously.

Physical Symptoms.—The physical symptoms show early in infancy, even at the time of birth. There is great emaciation of the body, and a peculiar old look about the face, which is wrinkled and swollen. The limbs are thin, and the abdomen is distended; sometimes there is goitre present. Towards puberty in favourable cases the condition may pass off, but in unfavourable cases it becomes more aggravated. The figure is short and squat; the head and face are large; the nose is flattened; the mouth is large; the lips thick and the teeth carious; the skin is earthy and pasty-looking, as well as wrinkled. Respiration and circulation are both slow and feeble; the appetite is gluttonous; but digestion is, nevertheless, vigorous, notwithstanding that many of the patients suffer from diarrhœa and from flatulent distention of the abdomen. In the slighter degrees of cretinism reproduction is not uncommon; in the more advanced degrees it is rarer or unknown. The children of cretins are usually markedly degenerate, both mentally and physically.

In the more advanced forms death usually occurs before the age of eighteen; in the slighter forms the patients may live until forty. They usually die of phthisis or of other intercurrent affections.

(*c*) *Myxœdema.*—There is a form of idiocy known as

myxœdematous idiocy or sporadic cretinism, which is not identical with cretinism, but which is due to a non-specific pathological affection of the thyroid gland. It is characterised physically by fatty masses under the skin in the subclavicular region, and by the pachydermatous and myxœdematous condition of the patient. The condition of idiocy and mental enfeeblement accompanying this affection is generally very complete. Within recent years extraordinary improvement in the condition of these cases has been obtained by the administration of thyroid gland extract.

Myxœdematous insanity in adults is accompanied by the usual signs of myxœdema. Mentally there is great sluggishness of thought and of ideas. Irritability is a marked feature, though in some cases placidity alternates with fretfulness and outbursts of temper. Delusions and hallucinations occur in about half of the cases, while mania or melancholia, with delusions of suspicion and self-accusation, occurs in an equal number. The memory is usually impaired, especially in respect of recent events. Sleep is usually always disturbed, either in the direction of wakefulness and dreaming, or more commonly by a persistent somnolence, both during the day and during the night. The treatment of the condition of myxœdema usually removes the mental symptoms.

III. Forms resulting from Voluntary Intoxication

(*a*) *Alcoholism.*—Alcoholic intoxication is in itself an insanity, or rather simulates every form of insanity in its various stages. Its recognition as a state of mental alienation has recently been advocated by some physicians, but there is much reason why the claim to this position should be disallowed. Repeated or prolonged acts of intoxication usually produce in predisposed individuals acute attacks of insanity.

There is a transitory form of mania which has been termed by some writers mania *à potu*, which occasionally follows alcoholic excesses in nervous and excitable people. It is said to occur most frequently in cases who only exceed at very rare intervals. The symptoms are a tendency to noisy delirium, and to the commission of violent and dangerous acts,

of which the patient retains only a very confused recollection, but which may nevertheless give rise to serious crimes and medico-legal investigations. Between simple intoxication and this condition of mania every stage of violence and excitement may appear. But there is generally little difficulty in distinguishing between the symptoms of intoxication and the true appearances of mental aberration, which characterise this transitory form of mania. The impulses may take various forms, such as incendiarism, theft, assault, or destruction of property. Some of the patients attempt suicide, while many of them fall into the hands of the police on account of the eccentricities of their conduct and outrageous behaviour. Many of the incidents recorded in the daily press under the heading "Strange freak of a drunken man" are frequently committed in a state of transitory post-alcoholic mania. Such patients are unable to account for their actions, and although they are undoubtedly impulsive, they seldom retain any recollection of the impulse or obsession under which they were then labouring.

Acute Alcoholism (Delirium Tremens).—Acute alcoholism generally follows excessive drinking in otherwise normal persons; but it is not infrequently met with in the course of chronic alcoholism in the absence of any unusual excess, following either moral shock, physical disease, or more commonly, accidents and operations. Acute alcoholism generally develops suddenly, and rapidly reaches its culmination. There are, however, occasionally prodromal symptoms which exist for one or two days beforehand, and which consist in a kind of malaise, with restlessness, fatigue, insomnia, or painful sensations.

Mental Symptoms.—The chief mental characteristics of acute alcoholism are terror, mental distress, and confusion of ideas. In a few cases the patients are unable to account for this condition, and are unable to say what they are afraid of. Such cases, though otherwise apparently collected, sit immobile and trembling, until their condition becomes insupportable, when they make violent attempts of an impulsive kind to escape from their imaginary dangers. Some of them rush unconcernedly straight in front of them, breaking or overturning

any object which opposes itself to their flight, and many of them hand themselves over to the police for protection. A considerable number of the cases have delusions of poisoning, and suspect everybody around them of intentions upon their lives. Others have strong impulses towards suicide, or attempt suicide, either in order to escape from some impending danger, or in obedience to their hallucinations of hearing.

The prominent symptom of acute alcoholism is the affection of the special senses, especially those of sight and hearing. Hallucinations of sight have always in this affection the peculiarity that they invariably assume similar forms. The patients generally see animals of the most repugnant description—cats, dogs, snakes, and spiders; and creeping things of every description are seen to emerge from the walls and floors, or to creep along the ceiling, and not infrequently assume a threatening attitude. They are the cause of inexpressible terror, and form one of the most distressing symptoms of the affection. The uniformity of the visual hallucinations in acute alcoholism in all cases and in all races is a singular and inexplicable phenomenon. It has been attempted to explain it on the theory that there exists in the retina a tremulousness of the rods corresponding to the neuro-muscular general disturbance, which gives rise to disordered vision, then to illusions, and finally to hallucinations. Hallucinations of sight are, however, not limited to those described, but may include apparitions of spectres, phantoms, assassins seeking for the patient's life, flames of fire, demoniacal forms, and strings, threads and ropes which entangle the body and are often felt (hallucinations of touch).

Hallucinations of hearing are also common. The patients complain of ringing in the ears, sounds like the rushing of waters, musket shots, whistlings, or voices which threaten them with death, or accuse them of imaginary crimes. Even during the height of the excitement the patients are conscious of their surroundings, although they require to be spoken to loudly and firmly in order to arrest their attention. Yet their recall to active consciousness is generally temporary, and they speedily return to the engrossing subject of their hallucinations. The memory of the patient usually remains

intact, so that he is able, even when he is supposed to be most confused, to retail afterwards what had occurred during his illness, as well as the symptoms by which it was characterised.

Most of the cases are impulsive and dangerous. It is impossible to follow their train of thought, which is entirely based upon, and actuated by, their hallucinations, and should their suspicions fasten upon any one in their immediate vicinity, they may commit, suddenly and without warning, serious homicidal assaults.

Physical Symptoms.—The physiognomy of the patients when the affection becomes established presents a mingled expression of mental confusion and terror. Their actions are irregular, and not properly under control. Insomnia is characteristic and persistent, in spite of all the means which are used for its relief. There is usually slight elevation of temperature, with gastric catarrh, at the commencement of the attack; the tongue is coated with a thick white fur; and sometimes the teeth, the lips, and the gums are covered with sordes. There is complete want of appetite, great thirst, and obstinate constipation. The face is flushed, dark-hued, and injected, and the skin is covered with sweat.

There are always disturbances of the motor mechanism, consisting exclusively in trembling and agitation of the muscular system. The trembling is most noticeable in the face, the lips, the tongue, and the hands. Speech is only slightly affected, the voice being sometimes tremulous. The attitude of the patients is uncertain and undecided. They lack distinct co-ordination, so much so that some of them cannot carry a glass of water to the mouth without great effort, while other cases exhibit a general tremulousness over the whole body, which can be felt with the hand.

A few cases have disorders of general sensibility which take the form of insects creeping on the skin, pricking sensations, or feelings of burning, gnawing, or cramps in the fingers and toes, or of lightning pains, which are referred to the bones. There are also frequently observed spasmodic twitchings of the muscles, sudden startings and shocks, which the patient compares to electrical commotions.

There are some cases of acute alcoholism in which the implication of the nervous system is much more grave, and which is accompanied by a high temperature, great mental agitation and muscular tremulousness. The face is swollen and red; the eyes are injected; the skin is hot and burning, and covered with a profuse perspiration; the pulse is accelerated, soft, and compressible. There is usually incoherent speech, with some difficulty of pronunciation, and tremulous contortions of the face when speech is attempted. The excitement is often violent; and the patients, who seem to labour under delusions, illusions, and hallucinations, require to be restrained in bed. This form usually terminates in death, either from nervous exhaustion or from pneumonia succeeding hypostatic congestion of the lungs.

Course and Prognosis.—Acute alcoholism is generally of short duration, rarely exceeding six days, and usually recovering about the third or fourth day, although in a few cases it may extend over two or three weeks. The excitement and agitation increase towards nightfall, and it may be often observed that there are remissions and fluctuations in the severity of the symptoms during the course of an attack.

The great majority of the cases recover after the cessation of the principal symptoms, but insomnia, troubled dreams, or nightmare may persist for a considerable time. The patients are especially liable to what are known as hypnagogic hallucinations, which occur between the periods of sleeping and waking, and are frequently vivid, distressing, and usually of a very terrifying nature. Many of the patients retain during the early part of convalescence an absolute belief in the reality of their delusions and hallucinations. While the insomnia, the hypnagogic hallucinations, and this belief in their erroneous ideas continue, the cases ought not to be considered as cured.

When death occurs, it is usually due to exhaustion, to suicide, to cerebral or pulmonary congestion, or to convulsive seizures.

Treatment.—Treatment should be directed towards calming the agitation of the patient by means of warm baths, continued for prolonged periods, with the application of cold to the head,

if necessary. The mixed bromides are also useful. The strength of the patient must be maintained by giving nourishing fluid food, such as milk, soups, or peptonised gruels. For sleeplessness the various preparations of opium are of great service, but their continued use is dangerous, and perhaps the most useful drug is bromidia, which should be given in drachm doses every hour until sleep is produced or the agitation relieved. As bromidia contains chloral, its extensive administration must be carefully watched. Almost all the cases require to be put under supervision of a skilled kind. If possible, they should be isolated from their friends and usual surroundings. Much aid in treatment can be obtained by firm control and by reassuring the patient with regard to his imaginary dangers and anxieties.

While it is generally advisable to stop abruptly administration of alcohol, no fixed rule can be laid down on this point; each case must be judged separately in accordance with the physical symptoms.

Chronic Alcoholism—Mental Symptoms.—On the mental side there is marked moral deterioration, emotional depression, and enfeeblement of the will. This enfeeblement of the will power is not confined to the inability of the patient to resist his alcoholic craving, but extends to other matters as well, so that he loses his power of initiative and of asserting himself, and becomes incapable of performing any work, except according to routine, and so becomes the tool of other people, by whom he is influenced and easily diverted from his purpose. In addition, these patients are indifferent to their own interests, and regardless of the feelings or prosperity of their relatives and families.

Any form of insanity may occur in the course of chronic alcoholism; but the character of the insanity is always more or less modified by the chronic mental condition which has been described. Acute attacks of mania and melancholia occur with great frequency in hereditarily predisposed individuals who are the victims of chronic alcoholism. Apart from the mental and physical peculiarities which have been described as pertaining to chronic alcoholism, and which are generally, but not always, apparent, there is nothing charac-

teristic about these insanities. Stupor also occurs in a small number of cases. It is of the melancholic form, accompanied by terrifying hallucinations, and very occasionally by expansive delusions of grandeur. It has been observed that this form of stupor is more often and more quickly recovered from than the non-alcoholic form. General paralysis also occurs in the course of chronic alcoholism. Its symptoms are indistinguishable from those of ordinary general paralysis, except that the tremulousness is believed to appear earlier, and to be more pronounced.

The most characteristic and most commonly occurring form of insanity is systematised delusion of persecution. In alcoholic persecution the hallucinations appear early, and precede the delusions, which fact distinguishes it from the ordinary forms of systematised insanity, where the hallucinations accompany and only assist in the systematisation of the delusions. In the alcoholic form, on the other hand, the hallucinations appear to produce the delusions. Hallucinations of sight, which are very rare in the ordinary form, are always present in the alcoholic form. The prevailing delusions refer to the sexual organs, the sexual relations, and to poisoning. These delusions are so constant that when a patient complains of attempts being made to mutilate him sexually, of the unfaithfulness of his wife, and of his food being poisoned, we are almost safe in assuming that alcoholism is the cause of his symptoms. The patients are all liable to exacerbations, accompanied by great excitement, terror, and impulsive and brutally homicidal actions.

Physical Symptoms.—The results of chronic over-indulgence in alcohol are manifested by distinct mental and physical pathological changes. On the physical side the most important and constant symptom is tremor, which decreases under the influence of the drug, and is most marked when the patient is quite sober. It is most observable in the hands, the tongue, and the lips. There is paresis of the extensor muscles of the legs, while cramps and chronic spasms frequently occur in the muscles of the extremities. In extreme cases there may be paraplegia, with hyperæsthesia or anæsthesia of various parts of the body, but more especially

in the lower extremities. Lightning pains are occasionally complained of, and every form of sensory nervous disturbance has been described by observers of this disease. Epilepsy is frequently met with, either as an established periodic affection, or occurring relatively as a consequence of unusual excesses in the drinking habits of the patients. The facial appearance is characteristic. There is a laxity and want of tone of the muscles of the face; the eyes are dull, and the expression defective. Most of the patients are anæmic and badly nourished, and there is usually present gastro-intestinal catarrh, and every stage of hepatic and renal disease. The vascular system becomes atheromatous, and the cardiac muscles are often the seat of fatty degeneration.

Alcoholic Dementia.—Most chronic alcoholics, if they live long enough, end in dementia. The symptoms vary considerably in different cases, but there is usually marked amnesia, the loss of memory being either complete or involving only recent events, so that although the patient is able to perform mechanically certain routine actions, he is totally unfit for ordinary work. There is moral degradation, morbid emotionalism, mental confusion, and incoherence of ideas. The muscular enfeeblement is more pronounced, and is usually increased after each epileptiform attack, which attacks are very common in alcoholic dementia. As a rule the mental and physical condition progressively deteriorates, until the patient becomes physically powerless and mentally extinct. The symptoms of alcoholism always persist, and the trembling of the limbs, the hallucinations, especially of sight, and certain speech modifications usually distinguish the origin of this dementia.

(*b*) *Morphinism—Mental Symptoms.*—The formation of the morphia habit is usually originated in taking the drug either for the relief of pain or among certain degenerates in the pursuit of the euphoria which follows its injection. Insanity may occur (1) in habitués after an unusually large dose; the symptoms are then temporary, and consist of hallucinations of sight, mental distress, or an apathetic somnolence, with mild delirium, from which the person is with difficulty aroused; (2) during the period of treatment, when the drug is suddenly stopped or too rapidly discontinued, an insanity

similar to delirium tremens, with hallucinations, maniacal agitation, and confusion of ideas may supervene. This insanity is also temporary, lasting usually from twenty-four to forty-eight hours. It is attended with great physical prostration, restlessness, vomiting, diarrhœa, cramps, and pains throughout the body, which continue for several days after the mental symptoms have disappeared. An injection of morphia immediately relieves both the physical and mental symptoms. (3) Chronic morphia intoxication produces a mental condition in many respects similar to chronic alcohol poisoning. Mental weakness, with inattention to details, loss of memory and diminished moral sensibility, are among the most important symptoms. The subjects are apathetic and indifferent in their manner, always untruthful, unreliable, and deceptive in their conduct. This condition of mind varies greatly in different individuals, and is of a rather intangible character, so that though there is the certainty of an abnormal mental state existing, and of a complete moral revolution, it is not always easy to define or to describe it. Some of the patients are impulsive and quite uncertain in their actions; others are negligent in their dress and behaviour; while others again are obviously eccentric or peculiar in almost every relation in life.

The most frequent forms of insanity are those characterised by delusions of persecution or by delusions of grandeur. These mental symptoms only occur as a rule after prolonged indulgence, or in those highly predisposed to the psychoses, or where both factors are combined. This insanity is usually accompanied by a varying degree of mental weakness, and is hopelessly incurable.

Physical Symptoms.—The physical symptoms characteristic of chronic morphinism are paresis, usually of the limbs, and especially of the lower limbs, ataxia, and tremor of the hands. Complete impotency, with loss of desire, takes place in men, and in women amenorrhœa and sterility. The appetite for food fails; digestion is profoundly disturbed; and there is obstinate constipation. Consequently there is emaciation, anæmia, and various trophic changes.

Treatment.—Where the habit has not been continued long

enough to produce systematised insanity, there is always a prospect of cure. The patients should be carefully isolated and placed in bed in the recumbent position. The drug is then to be administered by the physician, and it lies with him to determine the manner of its discontinuance. In mild, early cases it may be abruptly discontinued; but this is often dangerous. In chronic cases the sudden deprivation is sure to be attended with grave symptoms, such as syncope or fatal collapse, always with delirium. Erlenmeyer[1] recommends what he calls the quick deprivation method. Gilles de la Tourette[2] does not approve of this method in any case in which the daily dose has previously exceeded 25-30 centigrammes (3-5 grs.). Suppose, he says, that the subject has been in the habit of taking 60 cgs. in the twenty-four hours (10 grs.), give him 5 grs. in four or five doses the first day at his accustomed hours, and for the following three days give 1 gr. If the daily dose has previously been 1 gramme (15 grs.), give 7 grs. the first day and 1 gr. the following five days. If the habitual dose has been excessive, it is well to continue the demorphinisation for ten or twelve days. The various accidents of a serious nature usually occur within the first thirty-six hours after suppression of the drug. But even when the drug has been gradually discontinued, the sufferings of the patient are very great, and continue to be so for a long period—two to three weeks in some cases. Calomel in a purgative dose should be given early. Hot baths are useful for allaying the physical discomfort; so are the bromides. For sleeplessness, which is always present, bromidia or chloral may be tried with advantage. Light, easily digestible food in small quantities often repeated is necessary, and alcoholic stimulants, especially champagne, are usually of the greatest service in overcoming the tendency to heart failure.

(*c*) *Cocainism—Mental Symptoms.*—The only insanity which follows this drug is connected with its chronic use, if we except the agitation, with temporary hallucinations, which result from excessive single doses. As a general rule

[1] Erlenmeyer, *Die Morphiumsucht*, 1887.

[2] Gilles de la Tourette, *Leçons sur les Maladies du système nerveux* (1898), p. 254.

habitués of this drug use morphia also, so that the symptoms are complicated—unfortunately also intensified by the combination. The mental symptoms of chronic intoxication commence with visual hallucinations, followed or accompanied by hallucinations of touch. Auditory hallucinations appear later, and are, when constant, indicative of cerebral implication. Then occurs the characteristic insanity, which is a form of mania, with delusions of persecution. When the patients have reached this stage, they are almost always impulsive and dangerous, and require confinement in an asylum or strict supervision at home. Finally succeed loss of memory, confusion of ideas, and mental weakness.

Physical Symptoms.—Physical symptoms of cocainism consist in great emaciation, which is much more rapid and extreme than in any other form of drug poisoning, in constant insomnia, and in fatty degeneration of the liver. There is no marked motor nervous affection beyond tremulousness of the hands, and in advanced cases there is general muscular paresis. The solids in the urine are enormously increased; there is no interference with digestion and assimilation of food, and no gastric catarrh. At first there is intense sexual excitement, but in the later stages impotency and loss of sexual desire in the male.

Treatment.—Treatment should always aim at stopping the use of the drug either abruptly or gradually. On this point Erlenmeyer remarks that if the dose taken at a time does not exceed one gramme, deprivation may be sudden; if more than a gramme, then it must be gradual. He also states that the mental symptoms of abstinence are extraordinary mental depression, emotional mobility, and weak will power; while on the physical side there are dyspepsia, palpitation, and fainting fits—all these, however, after very large doses have been taken constantly for a long time. As a rule, the patients do not suffer nearly so much as morphia eaters during deprivation. Alcohol has to be given to strengthen the heart, and sometimes morphia to soothe the nervous system. Sleeplessness is always present, and if obstinate can be relieved by ordinary hypnotics.

(*d*) *Chloralism—Mental and Physical Symptoms.*—The

mental and physical symptoms produced by the long continued use or abuse of chloral are, on the whole, similar to those caused by alcohol and morphia. During the period of deprivation of the drug, and in chronic intoxication there are usually observed restlessness, depression of spirits, with emotionalism and mental weakness. Physically the patients are paretic, sometimes slightly paralysed; the heart's action is weak; and there is marked gastric disturbance, with skin irritation and eruptions.

Treatment.—The treatment is usually prolonged, and requires care and good feeding; tonics and iron for anæmia, which is constantly present, and change of air and scene.

Pathology of Alcoholism, etc.

(1) *Acute Alcoholism.*—Alcohol is a direct toxic agent in its action upon the nervous system. In experimental researches upon the lower animals poisoned subacutely by daily maximal doses Goldscheider and Flatau[1] found an irregular atrophy of the chromatic substance in the anterior motor cells of the spinal cord. This was especially well marked in the chromatic elements surrounding the nucleus. Some of the cells lost their processes, and where the achromatic filaments were diseased, great shrinking and distortion of the whole cell body occurred. Very extensive changes were found present in the cells of the cerebral cortex; often not one single cell showing a normal structure could be observed. Ghost cells abounded, and every degree of chromatolysis, from faint staining to absolute destruction of the cell body, was met with. The nuclei were smaller than normal, often angular in shape, and the nucleolus absent or non-observable. In more advanced stages the cell processes were broken off; the nucleus disappeared, and the cell body was swollen and diffusely stained. It has not yet been ascertained whether the cells in the different cortical layers were all implicated to the same degree or not.

(2) *Chronic Alcoholism.*—The longer the period over which the intoxication extends, the greater are the secondary

[1] Goldscheider and Flatau, *Nervenzellen* (1890), p. 65.

changes of the cortex and spinal cord. Apart from chromatolysis of the neurons, which is of course well marked and extensive, and which is especially seen in the large nerve cells (motor), the chief change observed microscopically is the great increase in the neuroglia elements, which form a thick felting in the outermost layer of the cortex immediately underneath the pia. This appearance is even more marked and more constant than in general paralysis. The hypertrophy and hyperplasia of the neuroglia cells follow also the course of the pial blood-vessels as they dip deeply into the cortex. These vessels acquire a prickly, spinous appearance from the enormous number of glia processes attached to them, as well as from the nucleated protoplasmic masses which cover their walls. The next position of election for the growth of neuroglia is the white matter of the brain at its junction with the layer of spindle cells. According to Bevan Lewis, this innermost layer of the grey matter always suffers severely in chronic alcoholism. The neuroglia cells are also found increased and enlarged throughout the whole white matter, but not to any great extent in the grey matter between the outermost and innermost cortical layers.

The blood-vessels of the brain both in the white and grey matter are affected in alcoholism. They are distended, present aneurysmal sacs which occasionally rupture, and their walls are irregularly atheromatous. The perivascular spaces are filled by numerous lymphoid elements, and Bevan Lewis states that the nuclei of the sheath are often mapped out by a linear series of oil-globules, which alone remain to represent the residue of the degenerated elements.

Sclerotic patches, softenings, local atrophies, and hæmorrhages are very common accompaniments of chronic alcoholic degeneration of the brain.

It should be added that the pia is often greatly thickened, its vessels much distended, and the pia-arachnoid trabeculæ contain fluid and degenerative products similar to what has been described as occurring in other chronic conditions.

The spinal cord is implicated very much in the same way as the brain. Its pia is thickened, and there is an increase in the glia elements under the pia and along the course of

the larger blood-vessels, which are tortuous and distended. But the different spinal segments are variously affected, and there is no systematic disease. The cell degeneration is particularly evident in the anterior cornu, but in different regions of the cord the cell groupings are variously involved.

Pathology of Morphia, Cocaine, and Chloral poisoning.—Not very much is yet known regarding the specific action of these poisons upon the nervous system, but judging from the clinical symptoms they are probably not much less toxic and destructive than alcohol. Nissl found in subacute poisoning with morphia that the chromatic substance became more sensitive to basic stains, so that the dendrites could be traced to long distances from the cell. He found that the whole cell was smaller and thinner, that its nucleus stained deeply, and that the basal part of the cells were more angular and more sharply defined.

In chronic poisoning by cocaine we infer from the symptoms that chromatolysis must be more intense and more extensive than in morphia or chloral poisoning; but when any one of these three drugs has been used excessively for prolonged periods, the ultimate results are attended not only by chromatolysis of cortical and spinal neurons, but also by such secondary tissue changes as we are familiar with in alcoholism and other chronic forms of insanity.

Pathology of Cretinism and Myxœdema.—In both conditions the disease is due to the deprivation of an essential element of the blood—the secretion of the thyroid gland. This has recently been denied by Dr. Welsh in this country and Dr. Munck in Germany. The former attributes the quality usually recognised as belonging to the thyroid gland to much smaller bodies situated more deeply in the neck—the parathyroid glands—and has shown that the removal of these small bodies is quickly followed by death in the lower animals. Dr. Munck has shown that removal of the whole thyroid gland may produce no bad effect. This is also confirmed by Welsh, provided the parathyroid bodies are not interfered with.

The toxin which causes atrophy, non-development, or disease of the thyroid gland in cretinism is either miasmatic, or enters the system with the drinking water. It may or

may not have a direct toxic effect upon the nerve cells, but its chief effect is upon the thyroid gland, which is so essential for the development and continued health of the nervous system. The changes observed in the brains of cretins are deficient development of the convolutions and of the cerebral blood vessels. The nerve cells are small, stunted, deficient in processes, and are of the peculiar globose form which is met with in idiocy and other defective forms of cerebral development. Two *post-mortem* examinations, the one by Dr. Fletcher Beach and the other by Dr. Savage, showed the vessels to be tortuous, and the cortical layer thicker than usual.

The changes in sporadic cretinism are as a rule more pronounced than those found in endemic cretinism.

Our knowledge of the morbid brain changes in *struma-priva* (myxœdematous insanity) does not permit of any detailed account, but the clinical symptoms distinctly indicate a profound interference with the nutrition of the nerve cells; hence we conclude that chromatolysis must be extensively present.

CHAPTER XV

THE INSANITY OF THE DEGENERATE

I. *Arrested Brain Development.*—The various conditions included under the above title differ according to the degree in which the mental faculties are arrested in their development. There is as much difference between the higher and lower forms of idiocy as there is between imbecility and idiocy. Some modern writers have therefore, for purposes of clinical classification, entirely discarded the term "imbecility," and have divided arrested brain development into the three following stages:—(1) Idiocy of the first degree (imbecility); (2) idiocy of the second degree (ordinary idiocy); (3) idiocy of the third degree, or complete arrest of mental development. These three forms are connected together by every grade and variety of original mental defect, so that no true line of demarcation can be drawn between one or other. The divisions are, therefore, purely artificial and arbitrary, and are chiefly of use for purposes of description only.

(1) *Imbecility or Idiocy of the First Degree—Mental Symptoms.*—Imbecility is a condition of brain arrest occurring either before birth or in early infancy. It is almost impossible in the great majority of cases to detect in early childhood any outstanding difference between imbeciles and normal children. It is only at the time when education begins to be communicated that it forms a test of the greater inaptness of the feebler-minded child to appreciate correctly the instruction which is given to it. As imbeciles approach the age of puberty, their mental defects begin to become apparent; besides being slow of apprehension and somewhat dull-witted, they are

deficient in ordinary interest, in judgment, and in common sense. In a certain sense it may be said of them that they do not grow old with their years, and when they approach adolescence they do so without any appreciable increase of responsibility. They remain childish, easily satisfied with trifles, and display a childish interest and curiosity in things which have long ceased to interest people of the same age. The sexual instinct is early developed, and generally manifests itself as an exaggeration or perversion of the normal condition.

The mental processes are slow, dull, and obtuse. The conceptions, the association of ideas, and power of initiative, are slow and difficult. Yet within their somewhat limited sphere of reasoning, they think and act in a normally logical way. Their mental life is a particularly simple one, and never passes into the abstruse consideration of any question. Their thonghts are entirely engrossed with the concrete present, although they lamentably fail in foreseeing, either the consequences of their actions, or the proper provision which they ought to make for the future. The normal life of ordinary people interests them very slightly, because they are incapable of understanding it; and it frequently happens that such individuals prefer the discipline and routine of asylum life to the care and responsibility of guiding their own actions, and providing for themselves.

The moral aberrations are as pronounced as the intellectual. They are extremely egoistic, vain, and sensitively proud; some of them are capable of strong religious emotion without manifesting any intellectual grasp of religions duty, or without being able to inquire into the origin of their religions emotionalism. Their family ties and affections are extremely feeble, and although they are often capable of forming strong attachments, they are as a rule incapable of feeling any normal sorrow at the death of their friends or relatives; and like children, a very short separation has the effect of making them forget people of whom they had formerly been very fond. Altruistic ideas, as well as the moral discrimination between right and wrong, are foreign to their nature, and their only guide in such matters is the discipline exercised over them by other people.

Many of them are able to earn a somewhat precarious livelihood by ordinary manual labour or by working at some trade which they have learned indifferently well, and the technique of which they are only able to execute imperfectly. Whatever work they do generally requires the active supervision and guidance of others. Most imbeciles are untruthful and unreliable, especially in small matters, such as appropriating trifling articles which do not belong to them. They are often irritable, and are subject to frequent outbursts of rage and excitement on inadequate occasions. The artistic sense in imbeciles is rarely developed to an exceptional degree, although a few of them are musical, while others exhibit an extraordinary memory for details, or arithmetical powers which are wholly disproportionate to their general mental development. Some of them exhibit a wonderful power of repartee, and a dry form of humour, all the more surprising on account of its unexpectedness. It was on account of this trait that such individuals in bygone times were selected as the fools and jesters of kings and courts. Imbeciles are subject to attacks of excitement or mental depression, which have a tendency to recur periodically. It is during these attacks, especially of excitement, that they are prone to commit criminal and morbidly impulsive acts. A considerable proportion of imbeciles are afflicted with epilepsy.

Physical Symptoms.—The physical characteristics in imbecility are not numerous. The subjects are usually well formed, and their outward conformation differs but slightly from that of normal individuals. The facial expression usually indicates a want of mental power; and certain defects of speech, such as lisping, stammering, and imperfect pronunciation, are very common, to which it may be added that the patients have a tendency to misapply the meaning of certain words, and that they appear to misunderstand the grammatical use of certain parts of speech, especially adverbs, and occasionally the infinitive mood of verbs.

The physical resistance is lowered, and the activity of the various bodily functions is much less vigorous than in normal individuals. Hence it is that the patients easily succumb to bodily illnesses, especially of an infective origin,

and that a considerable percentage of the cases die of phthisis.

(2) *Ordinary Idiocy, or Idiocy of the Second Degree—Mental Symptoms.*—The arrested development in this condition is more marked and more extensive than in simple imbecility. The condition is usually congenital, or the lesion which arrests the development of the brain occurs at a very early stage of infancy. The intellectual affection is extremely various in different cases. As a rule the patients are fairly conversant with their immediate surroundings; they know their own names, and are able to respond to them when addressed. Their command of language, however, is extremely limited; they are only able to pronounce a few words, or at any rate a few phrases, the correct significance of which they know. They particularly use interjections and nouns. It is impossible to educate them either to read or to write beyond the very simplest words. Some of them show an aptitude for drawing imperfect resemblances of substantive ideas which they wish to express. They are unable to count beyond a certain number, and arithmetic is entirely beyond their power. A great many idiots possess the faculty of imitation very strongly; but in most of them the imitative art is imperfect and grotesque. Their sentiments are usually confined to a crude appreciation of pleasure and pain, either of which they express emotionally without self-control, and in a primitive, barbaric manner. They are capable of manifesting a certain kind of affection, akin to a dog-like attachment, to those with whom they live, and who treat them kindly; but the feeling is never profound. They are capable of a certain amount of training and discipline in the direction of their external behaviour. If left to themselves, their instincts and manners become so repulsive that it is impossible to live in their society; but if properly trained, they learn to dress themselves, in an untidy manner certainly, to eat inoffensively, and to control their animal instincts.

Physical Symptoms.—As a class, idiots present more than any other the greatest variety and accentuation of physical stigmata. As a rule the body is stunted, and the whole appearance suggests abnormal development. Microcephalism

is common in a large number of cases. Hydrocephalism is also met with in many cases, and extreme brachycephalism. The following other malformations are extremely common :— flattening of the cranial vertex, low forehead, swiftly receding forehead, flattening of the occiput, with absence of the occipital protuberance, asymmetry of the opposite sides of the head and face, prognathism, extreme vaulting and narrowness of the palate, and flattening or asymmetry of the palate. The teeth are liable to all possible variations from the normal type. The second dentition may fail altogether ; when it does occur, the teeth are invariably badly formed, discoloured, and markedly carious.

The eyes are subject to every form of variation. In what is known as the Mongolian type of idiot, they present the true oriental appearance, being set far apart and almond-shaped. In other cases the distance between the eyes is abnormally abbreviated. Strabismus, astigmatism, and anomalous pigmentation are frequent.

Idiots are subject to various disorders of the gastro-intestinal tract, especially to inflammatory conditions of the mucous membrane, attended with persistent diarrhœa. The skin presents every variety of malformation. It is usually somewhat pigmented and unhealthy looking, and gives off a disagreeable odour. The skeleton is subject to all forms of malformation, most of the individuals being diminutive, ungainly, and ugly. Their movements are inco-ordinate and clumsy, while in walking they progress with a somewhat hopping movement, at the same time dragging their feet along the ground.

Epilepsy occurs in about 25 per cent of all idiots. They are subject in the majority of cases to attacks of maniacal excitement, while most of them exhibit irritability of temper and a tendency to instinctive impulse.

The physical resistance is even less than in imbecility, and few of them live longer than thirty years of age, pulmonary phthisis being a great cause of death.

(3) *Complete Idiocy, or Idiocy of the Third Degree—Mental Symptoms.*—The greater number of the members of this division manifest scarcely any signs of psychical life. Their intelligence is nil, and all the mental faculties are practically

abolished. There remains only at the most a species of local memory, applicable to the most simple habitual wants, and to the requirements of the moment. There is no will-power, and no trace of the faculty of initiative. They have no power of expressing themselves by means of articulate language, but some of them succeed in making known their desires by certain signs, cries, or sounds, understood only by those in immediate attendance upon them. It is with difficulty that they recognise their relations or attendants, and these may be replaced by strangers without any sign on the part of the idiot that a change has taken place in his surroundings. The absence of language may be regarded as a sign that these unfortunates have very few ideas to express.

The presence of instincts or sentiments of any kind is not revealed in these cases. Many of them do not appear even to be conscious of their own existence, much less of the ordinary feelings of pleasure, pain, fear, or love. In the great majority of the cases, the sexual instincts are absent. The only instinct which they exhibit is that for food, and even it is expressed only when food is presented before them.

Physical Symptoms.—Many of them are in the habit of making use of automatic movements, either with their hands, feet, or head, or by swaying the body rhythmically backwards and forwards. On account of this peculiarity, this form of idiocy has received the designation of automatism. The facial expression is marked by the most complete hebetude, only relieved by the occasional appearance of passing emotion of a superficial and vague kind. The general impression left upon the observer of one of these faces is one of a peculiar mingling of infancy and old age. The face is often swollen and puffy, or deeply wrinkled. The lips and chin are covered with a lichenous and papular eruption. The form of the head is very variable, being either microcephalic or macrocephalic, and the size of the face is always disproportionate to that of the head, being in the former case too large and in the latter too small. The eyes are frequently strabismic, small, and deeply imbedded in their orbits. The lips are thick, the mouth large, and the tongue has a swollen appearance. The mouth is usually filled with saliva, which is constantly over-

flowing. The neck is generally short and thick, and the head bent forward. The skin has an earthy colour, and is covered with an oily secretion which gives off an offensive odour. Most of the cases are unable to walk; and when they do so, the gait is tottering and uncertain, and the other muscular movements are inco-ordinate and ungainly. The human instincts are so deficient that bladder and bowel are evacuated indiscriminately. They eat their food with their hands, and with so much avidity that they do not masticate at all.

The special senses are blunted and feeble, and in most cases there is anæsthesia and analgesia of the skin and mucous membrane. Very few of them exhibit any great sensibility to pain. Among the disorders of motility may be mentioned general and local spasms, chorea, epileptic and epileptiform convulsions, while contractures of the limbs, hemiplegia, and local paralyses are very common. Many of them on this account are unable to walk or to stand erect.

Ætiology of Idiocy and Imbecility.—In all forms of idiocy and imbecility which are not due to some accidental injury, the great predisposing cause is heredity. Mental disease, epilepsy, hysteria, alcoholism, and syphilis are usually met with, singly or combined, in the parents or grandparents of mentally defective children. Consanguineous marriages are regarded by some authorities as one of the chief predisposing causes. It is, however, doubtful whether mere consanguinity of the parents, in the absence of any family taint, which of course in such cases falls with redoubled force upon the offspring, has so great an influence as is generally believed.

Various cerebral disorders occurring in early infancy, such as meningitis, hydrocephalus, and cerebral hæmorrhages, cause brain arrest. Zymotic diseases, especially measles and scarlet fever and their sequelæ, frequently give rise to secondary cerebral conditions, ending in local arrest of cerebral development. Blows, falls on the head, compression of the head during labour, and even injuries received by the fœtus *in utero* may result in permanent brain injury and subsequent mental defect.

Pathology of Arrested Brain Development.—To those

interested in the subject of arrested brain development, no better book can be recommended than Ireland's [1] *Mental Affections of Children.* Following a pathological symptomatology in his description, he divides idiocy into (1) genetous (or congenital without any manifest ætiology other than heredity); (2) microcephalic; (3) hydrocephalic; (4) eclampsic; (5) epileptic; (6) paralytic; (7) traumatic; (8) inflammatory; (9) sclerotic; (10) syphilitic; (11) cretinism; (12) idiocy by deprivation. Such a list exhausts or almost exhausts the known causes of arrest of mind development.

In cases of congenital idiocy the brain convolutions present a simple arrangement, suggestive of a tendency to revert to the type of the higher mammalia; thus they may either present few secondary folds, or be small, slender, and curling (microgyri). There is very frequently observed arrested development of certain convolutions, especially in the frontal and parietal regions, which give to the brain a peculiar irregular appearance. The size of the cerebrum relative to that of the cerebellum may be deficient, so that the latter is not covered over by the occipital lobes, as is the case in the carnivora and higher herbivora. Parts of the brain, most frequently the corpus callosum, may be absent. Many inequalities in the development of the two hemispheres have been recorded.

In the second and third layers of the cortex of the ape, and in a similar situation in the cortex of the pig, Bevan Lewis [2] describes a perfectly globose cell with a single delicate apex process and two or more extremely delicate processes, without any angular projection from the cell, but a perfectly uniform rounded contour. These cells are met with in man only in idiocy and imbecility. Hammarberg (quoted by Ireland) found the pyramidal cells fewer in number than in the normal man. But in some cases he found that this paucity was limited to certain parts of the brain. If only a small portion of the brain was arrested in cell development, presenting imperfectly formed cells, and the remaining portion normal, though having fewer cells than usual, the individual was, according to Hammarberg, not idiotic but imbecile or weak-

[1] Ireland, *Mental Affections of Children*, 1898.

[2] Bevan Lewis, *loc. cit.* p. 70.

minded. Where the cells are wanting or very few, the idiocy is profound; where the cells are more numerous, though at places globose, badly developed, or degenerated, there is more intellect. Ford Robertson found a band in the cortex of an idiot boy extending from the frontal to the occipital lobes, corresponding to the position of the layer of large pyramidal cells, and which was evidently due to the non-development of these cells. Concomitant with these arrests in the development of nerve cells, there is of course a corresponding diminution in cell processes and consequently in the number of the nerve fibres of the cortex. Notwithstanding that there are some dissentients from these opinions, there need not be any doubt that in congenital (idiopathic) idiocy and imbecility the essential pathological histology is a failure in various degrees in the development of the cortical neurons, and that the degree of mental weakness depends upon the degree and extent of the affection of these elements.

Microcephaly may be partial or general. It is due to an arrest in the development of the nervous system which involves not only the brain itself but the spinal cord, the appendages of the nervous system, and the walls of its bony cavity. The cerebellum is, however, relatively larger than the cerebrum; the cerebral convolutions are simple, the sulci confluent, and the contour of the whole encephalon is suggestive of that of the anthropoid apes, though there are essential points of distinction between them.

Hydrocephaly is sometimes congenital, but more frequently comes on after birth; at other times it is acquired in the first few years of childhood. It is due to accumulation of fluid within the lateral ventricles. In a small number of cases the fluid lies between the skull and the membranes of the brain (*hydrocephalus externus*). The pressure of fluid within the ventricles deranges the cerebral functions. The medullary matter forming the walls of the ventricles becomes hard and tough, while the cortical grey matter becomes thin, anæmic, and atrophied. When the walls of the cranium expand, and when Wormian bones are formed in some of the sutures, the injury to the cerebral tissues is less, but if for any cause the cranial sutures ossify before the process has

reached its height, the brain implication and the clinical symptoms of mental decay are much more grave.

When epilepsy is the cause of mental arrest before the age of seven, Dr. Ireland classifies such cases as epileptic idiots. Whether or not epilepsy is a cause or a concomitant only in these cases, there can be no question that in typical epileptic idiots is found the most elementary type of human nerve cell. These cells are spherical, globose, and very deficient in processes, and the nucleus is changed in form and position. Not only so, but they may present every form of chromatolysis, which is probably the result of the epilepsy. There is also great increase in the neuroglia elements, and according to Ireland and Batty Tuke, dilatation of the cerebral vessels, with great deposit of albuminous molecular deposit outside the vessels.

Cerebral paralysis in children is due to disease of the blood-vessels, and the region most often implicated is, as in adults, that supplied by the middle cerebral artery. Hæmorrhage from that vessel, generally from its meningeal arteries, which affects the motor convolutions, may take place before birth, when the paralysis is more severe, or in early infancy or childhood as the result of coughing or diseases which determine brain congestion. It may also be due to injuries, especially those caused by prolonged and difficult labour.

From whatever cause it may originate, it has almost always the effect of limiting the mental development, and producing hemiplegia, sometimes paraplegia. Injuries to the brain may be of various kinds, occurring *in utero* chiefly as the results of attempts at abortion, during difficult or badly managed labours, owing to accidents or clumsy use of the forceps, or in infancy from different causes. Traumatism, where the brain tissue is not lacerated, usually acts as a cause of idiocy by setting up inflammation of some part of the brain. It is manifest that the mental effects of injuries to the undeveloped brain will depend upon the seat and character of the lesion.

The influence of inflammation of the brain and its membranes in causing idiocy would appear to be as yet somewhat obscure. The cause of cerebral inflammation is not under-

stood. It may probably occur before birth or be the result of infantile fevers, or of middle ear disease occurring as a sequela of some of the exanthemata after birth. It may also occur as an idiopathic affection. When necrosis of the cerebral tissues does not follow the inflammation recovery may take place; but after apparent recovery mental arrest often ensues, accompanied or not by progressive cerebral atrophy or cerebral hypertrophy.

Sclerosis (sclerotic idiocy) may occur secondarily to traumatism or inflammation, or independently, when it is usually associated with the tubercular or alcoholic diathesis in the parents. The affection usually manifests itself from the first few weeks up to the second year of infancy. Ireland[1] says "on removing the membranes of the brain, the scattered whitish sclerotic masses are seen elevated above the cortical tissue, which is of a salmon colour. The pia mater is not adherent to the sclerosed masses; sometimes it is over the remaining cortical tissues. The gyri are crowded against one another so that the separation of the sulci is much effaced. The sclerotic process mainly affects the cortex, though the white matter is sometimes involved. The corpora striata are sometimes affected. The weight of the brain is often rendered unequal by the atrophy of one side."

Syphilis is not such a frequent cause of idiocy as was at one time supposed, and when it acts as a cause, it does so secondarily by producing some disease of the skull membranes, arteries, or brain tissue, such as have been already mentioned; but even these changes are not so commonly present in idiocy as the frequency of syphilis in the population would *a priori* lead us to infer.

II. *Premature Dementia.* (*Dementia Præcox—Hebephrenia*).—We have now to consider a group of cases in whom the early years of life may present nothing abnormal, some individuals indeed showing promise of quite exceptional mental ability, who yet as they approach adolescence manifest intellectual arrest, with insane and sometimes alarming conduct, followed by permanent mental arrest. The cases whose career in life is thus prematurely blighted show clinically various

[1] Ireland, *loc. cit.* p. 205.

degrees of intensity in their symptoms. In the milder cases the symptoms are so imperceptible and so little troublesome that they seldom, in the early stage at any rate, are submitted for medical advice or treatment, but are looked upon by their friends as evidencing unfortunate defects in character and conduct. The first chief sign in such cases is an inability to perform the usual work or mental tasks with the same correctness or facility as formerly. Although there may be no apparent lack of endeavour or industry, there is a defect in attention and concentration, with mental powerlessness. Hypochondria is often a frequent and distressing symptom. The subjects probably feel unwell, but in any case they complain of various ailments which have no physical reality; they eat food irregularly, sleep badly, and lie in bed to the annoyance of their friends, while apparently quite fit to be about and doing. Added to this, there is often a strange waywardness and display of temper which make their society very trying to others. They may develop vague delusions of persecution, in which their near relatives always figure as the persecutors, or vague delusions of grandeur regarding their own position. Many of them have hallucinations of hearing, and it is common to hear them complain that their food is poisoned or tampered with by their friends. All these morbid ideas, however, are unreal, foolish, and ill-defined, and have very little influence on the life and conduct of the person. The grand underlying mental symptom is a progressive mental weakness and confusion which tends to terminate in dementia. During the course of these events the patient's memory remains fairly good: he is quite conscious of his surroundings, and is able on the whole to converse rationally and intelligently; but his conversations are apt to deviate into foolish bombast or extravagance, with the introduction of new words and phrases, which signs are particularly evident in his writings. There is also from time to time a tendency to fits of depression and despondency, or to uncontrollable excitement, or to argumentativeness and irritability. The patients appear to be aware of their mental disturbance and incapacity; but no regret, no care or fear for the future for a moment dims their mind. They become indifferent, stupid, foolish,

and improvident, and the will power is affected either in the direction of a foolish obstinacy or a no less foolish facility.

The course of this affection may be arrested at any stage after a few months or years; but it always leaves behind it a permanent degree of mental incapacity, which lasts during the remainder of the patient's life. Many blasted careers, blighted prospects, and inexplicable life failures result from this disease. Large numbers of beggars and tramps, drunkards, prostitutes, and criminals in one stratum of society, and of eccentrics and borderland cases in other social strata, are the victims of dementia præcox.

The more severe forms of this affection are generally those which the physician has an opportunity of observing. Cases of this kind usually present distinct mental symptoms, such as listlessness, apathy, a want of mental power and attention, depression of spirits, sometimes excitement, insane or violent conduct, or attempts at suicide. At the same time there is malaise, emaciation, sleeplessness, refusal of food, and a tendency to lie in bed for days at a time. Hallucinations, at first of a vague kind, may gradually become pronounced, and are then associated with delusions of persecution. Or the patients become stupid and indifferent, unable to converse rationally on any subject, their thoughts wandering off to irrelevant and disconnected matters. At this stage the conduct becomes uncertain and unreliable, and assaults upon relatives or foolish attempts at suicide may be committed. Some of the cases also exhibit a tendency to grandiose delusions, with mild excitement; but this condition is usually short and passing. Gradually the symptoms subside; the delusions disappear; the conduct becomes more steady; but sooner or later it is apparent that the patient is profoundly demented, and though perhaps capable of mechanical work and of living harmlessly among others, it is soon seen that he is devoid of initiative, of intelligent suggestion, or of taking his place as a unit of any value in society.

During the active course of the affection sexual excitement, with or without excessive masturbation, is very common.

This disease is undoubtedly developmental, and essentially predisposed to by the neuropathic constitution. It occurs

usually between the ages of sixteen and twenty-two years. According to Kraepelin,[1] it is three times as common in the male sex as in the female, and the same author states that from 5 per cent to 6 per cent of all cases in his clinique were of this character. He also says that the original abilities of the patients were usually good, often even excellent, but that in a few cases there had always been observable a certain degree of mental weakness. Without knowing the history it is often impossible to distinguish the cases after they become demented from conditions of congenital imbecility or secondary dementia.

The course of the disease is very variable, extending from a few months to several years, and as has been indicated, dementia of varying degrees invariably succeeds. The prognosis is therefore always unfavourable.

III. *Moral Insanity.*—Moral insanity was first described by Pritchard, who defined it as "a morbid perversion of the feelings, affections, and active powers, without any illusion or erroneous conviction impressed upon the understanding; it sometimes co-exists with an apparently unimpaired state of the intellectual faculties."[2] This affection may precede the appearance of ordinary forms of insanity, such as acute mania, general paralysis, or senile insanity. It is an invariable accompaniment of almost all forms of mental disease; so much so that Esquirol remarked, "This moral alienation is so constant that it appears to me to be the proper characteristic of mental derangement. There are madmen in whom it is difficult to discover any trace of hallucination; but there are none in whom the passions and moral affections are not disordered, perverted, or destroyed. I have in this particular met with no exceptions."[3] Moral insanity may undoubtedly follow many of the neuroses, such as hysteria and epilepsy, brain lesions, such as apoplexy and traumatic injury, and may remain as a permanent result of acute mental affections.

The form of moral insanity most commonly met with among the degenerate is congenital, and may or may not be

[1] Kraepelin, *Psychiatrie*, 1896.
[2] Pritchard, *A Treatise on Insanity*, 1835.
[3] Esquirol, *Dict. des Sc. Méd.* vol. xvi.

accompanied with intellectual weakness. It has been urged by some authorities that moral decadence or moral non-development cannot exist without some intellectual weakness. If, however, we use the words "intellectual weakness" in the narrower sense of imbecility, and apply to these cases the test of the average normal standard of human intelligence, we shall find that while a few fall short of that standard, many come up to it fully, and a certain limited number surpass it. Taking, then, the cases as a whole, it would be erroneous to regard them as imbeciles, and the only alternative is to believe that here we have to do with a congenital perversion of the moral nature without any marked defect of intelligence. On the other hand, the moral defects of imbeciles and idiots are too well known to require a detailed description; they have already been alluded to when dealing with mental arrest.

Most of the cases of moral insanity show early symptoms of their peculiarity. Eccentricity of conduct, singular and absurd habits, a propensity to perform the common actions of life in a different way from other people, can undoubtedly be called a form of moral insanity; but it can hardly be said to constitute the affection by itself. When, however, such symptoms are combined with a wayward and impracticable temper, an absence of social instincts, of normal affections, and an aversion to relatives and friends, the case becomes tolerably well marked. There is, however, another group of cases in which there is no marked eccentricity or unconventionalism, the children being bright, intelligent, quickly receptive, often emotionally impressionable, perhaps to a morbid degree, but totally lacking in the very elements of the moral perception. They seem incapable of distinguishing between truth and lies, so that their statements on the most ordinary matters of fact are never believed. They steal systematically; are incapable of proper affection for their relatives; and have no sense of shame. In some cases it is unwise to pronounce too hasty a judgment, especially if the children are very young, because it may happen that the moral sense is only retarded in its development, and that they may yet possibly fully acquire it. Some years ago I had under my care a boy of thirteen, whom it was found quite impossible to manage at home. He was

well developed for his age, very healthy looking, extremely apt and intelligent, and had easily passed the fifth standard at school. He seemed incapable of telling the truth on any matter whatsoever; his favourite amusement was torturing animals; he destroyed almost all the cats in the village near which he lived. It seems that after capturing them, he buried them alive in a field belonging to his grandfather, and marked the place of interment with a small heap of stones. He killed some of his grandfather's calves by ripping up their abdomen with a pocket-knife, and destroyed and burnt furniture. When punished, he became semi-maniacal, and tore his clothing to pieces, and in order to prevent his escaping naked from the house on these occasions, he had to be securely fastened. After he had passed the age of fourteen it became apparent that he was slowly acquiring self-control, and he was discharged from the asylum, with no subsequent recurrence of his former misdemeanours. Unfortunately in other cases, any expectation of this kind is doomed to disappointment. When the moral sense is not acquired in the process of development, the derangement continues to manifest itself throughout life in the feelings, desires, and actions of the individuals. Such persons are egoistic, and yield without control to their impulses and desires. Indeed it would seem as if their whole conduct were governed and directed by immoral motives, and there is usually no evident desire manifested to resist them. These persons become sources of infinite trial to their friends and relatives. They are constantly embarking on new enterprises in life, which as constantly end in failure. In nine cases out of ten, these failures are due to their own fault, or at any rate to the impropriety or unconventionality of their conduct. At the same time, they exercise their intellectual faculties, usually very acute, in the gratification of their selfish desires, or in the justification or excuse of their conduct, rather than in the pursuit of any continuous honest endeavour. Their extraordinary affinity for evil courses leads them to indulgence in habits which accelerate their degeneration, or which ultimately result in ostracising them from respectable society. There are undoubtedly many cases in whom the moral sense is extremely

attenuated, and whom no appeal based upon moral grounds can affect; yet who are possessed of such clear intelligence that they are able to perceive the inadvisability of pursuing certain courses, or are able to conceal their immorality, so that they continue to lead their lives without reproach.

The criminal classes who inhabit certain quarters of the larger European towns form, as it were, the endemic variety of moral insanity, just as the cases above referred to may be described as the sporadic form. The born criminal is a degenerate, physically, intellectually, and morally. The stigmata of degeneration are well marked in the individuals of this class, and in addition they suffer from tuberculosis, epilepsy, and deficient vital energy, and notoriously give themselves up to intemperance, rioting, and debauchery, as well as crimes against society. They are without moral sense, and in the presence of temptation have no self-control against crime. "Scarcely one of them may be said to die of one disease, for almost every organ of the body is diseased, and the wonder to me is that life could have been supported in such a diseased frame. Their moral nature seems to be equally diseased with their physical frame, and whilst their mode of life in prison reanimates their physical health, I doubt whether their minds are equally benefited, if at all. On a close acquaintance with criminals of eighteen years' standing, I consider that nine in ten are of inferior intellect, but that all are excessively cunning" (J. B. Thomson).[1] In addition to the perversion or entire absence of moral sense, many of them are subject to acute forms of insanity, to epilepsy, and to other nervous diseases. I have at present under my care a woman who has been convicted fifteen or twenty times for theft, assault, and various misdemeanours. Four of these convictions were for major offences, for which she was confined in the General Prison at Perth. She has been five or six times certified as insane and confined in asylums. Her symptoms on these occasions were delusions of persecution, with hallucinations of a sexual nature, and frequent maniacal outbursts. In the asylum she is, when comparatively sane, troublesome, cunning, and treacherous. Outside she is alco-

[1] J. Bruce Thomson, *Journ. Mental Science*, vol. xv. p. 492.

holic, a prostitute, and with criminal proclivities. Yet this woman is not a born criminal, but descended from apparently respectable parents. "Crime," says Maudsley, "is clearly sometimes the result of an actual neurosis, which has close relations of nature and descent to other neuroses, especially the epileptic and insane neuroses. No wonder that the criminal psychosis, which is the mental side of the neurosis, is for the most part an intractable malady, punishment being of no avail to produce a permanent reformation. A true reformation would be the reforming of the individual nature. How can that which has been forming through generations be reformed within the term of a single life? Can the Ethiopian change his skin or the leopard his spots?"

CHAPTER XVI

INSANITY OF THE DEGENERATE—*continued*

MORAL INSANITY—*continued*

Aggressive Persecution Mania.—The subjects of this interesting and special variety of moral insanity have been termed by the French writers "*Persecutés Persecuteurs.*" Krafft-Ebing calls the same mental affection by the name of *Paranoia querelens.* The subjects of this insanity are from early youth characterised by peculiarities of manner and temperament which mark them as highly neurotic. They are fickle, unstable, obstinate in their opinions and combative in the maintenance of their views, which are always better than those of other people. Others, while more correct morally and intellectually, yet seem unable with persistence to carry out any course of life or profession. These people are constantly changing from one walk of life to another or from one trade or profession to another. They are always ready to attribute their failure or want of success to the malignity or jealousy of their employers or fellows. They present, moreover, an emotional exaltation and a want of judgment which prevents them from counting upon the obstacles which oppose their schemes. This intellectual feebleness and defective judging power leads them into all manner of contests with their fellowmen—verbal quarrels, lengthy correspondence, lawsuits, assaults, imprisonment for misbehaviour, or incarceration in an asylum. When the subject once enters a law court, either as a criminal or a civil suitor, his course becomes confirmed, and he becomes a litigant for the rest of his life. His sequestration in an

asylum is followed by voluminous correspondence—demands for liberty, complaints against the management, and vituperation of the officials. The struggle with his relatives and neighbours generally ends in his discomfiture, but always the patient emerges as a victim crushed by the machinations of his enemies and persecutors. No argument, no entreaty, no promises on the part of the subject are of any avail. On the first opportunity that presents itself he resumes his hopeless struggle, and his future unsuccesses only tend to confirm his insane ideas of persecution. Not infrequently the public is deceived by the adroitness of the subject in preparing his defences and stating his grievances. It is willing to make great allowances for exaggeration, the result of prolonged provocation, and is apt to consider that the individual has already atoned by his troubles for any indiscretion he may have been guilty of in the past. The feeling of injustice dictates to the patient the resort to violence against his persecutors. Indeed few of the insane are more dangerous than the class of aggressive maniacs.

As the disease advances, along with the more marked intellectual disturbances appears a moral decadence. The patient becomes suspicious, treacherous, and impulsive. He assumes the *rôle* of a calumniator, and declares a personal war against social institutions in general. His threats become more and more open, and his temper more uncertain. Confinement in an asylum does not tend to modify his symptoms, but only to direct them towards the doctors, the officials, and the general management, who are denounced and exposed in scathing terms.

In many respects they resemble in their general features the subjects of the Chronic Progressive Insanity of Persecution, but they are distinguished by the almost *universal absence of sensory disorders and of hallucinations of hearing.* When hallucinations are present in a limited number of cases, they are indefinite; they have little influence upon the course of the insanity or its systematisation; and they show no tendency to evolution or change. There is never any evolution in the course of the malady, and no tendency for the symptoms to pass from persecution to ambition. Many

of the cases do manifest delusions of grandeur and ambition, but the ambitions do not modify the general character of the insanity, which is from first to last persecution.

According to their tendencies aggressive persecution maniacs have been divided into groups.

(1) *The litigious group* contains those cases who have an insatiable thirst for litigation and legal proceedings. They appeal their cases from Court to Court, and when they are finally debarred from further litigation, having exhausted the machinery of the law and the patience of legal officials, they find means of directing the attention of justice towards themselves by some trifling criminal offence, such as theft or assault upon a prominent person.

(2) *The group of general perseeutors* who have no friends and who make enemies of all those with whom they come into official relationship. These patients are more seriously affected morally and intellectually than the preceding group. They are very aggressive and apt to be impulsively dangerous, having less control over their passions.

(3) *The group of "affiliating" patients* who claim relationship with various persons with whom they have no connection, and who persecute these people and others.

(4) *The group of amorous perseeutors* who conceive a violent affection for some individual, and make him or her the subject of such pronounced attentions as to constitute a persecution in itself. On the other hand, they may actually persecute the object of their affections. In this group should be classed Clouston's "Old Maids' Insanity." He thus describes it: "The disease occurs usually in unprepossessing old maids, often of a religious life, who have been severely virtuous in thought, word, and deed . . . and who form a grotesque and baseless passion for some casual acquaintance of the other sex, whom the victim believes to be deeply in love with her, dying to marry her, or aflame with sexual passion towards her, or who has actually ravished her after having given her chloroform. . . . The annoyance to which unfortunate men are subjected in this way is often extreme. . . . Usually a clergyman is the subject of this false belief. . . . I have known grave accusations made to ecclesiastical

authorities, and the beginning of most injurious famas started by such insane women. . . . None of the cases altogether recovered from this form of delusion."

The prognosis of this form of insanity is very unfavourable, and the treatment difficult, and, it may be added, hopeless. Residence in an asylum has very little effect in modifying the symptoms in the majority of cases, while in others the disease undergoes a modification for the better. The strength of their malign passion seems gradually to lose its force, and they limit themselves to inoffensive protestations, and are easily pacified. In such cases the amelioration must be attributed to a slowly increasing weakness of the mental faculties. There are some cases, however, who recover so far their mental equilibrium as to render them suitable for positions of comparative usefulness and trust in asylums.

IV. *Episodic Syndromes in the Degenerate.*—These symptoms, which are not necessarily accompanied by mental disturbance, invariably depend upon a condition of general neurasthenia. Symptoms of neurasthenia may appear in all classes of the degenerate, complicating other forms of mental affection; but they are most clearly seen in the higher degenerates, who may show no other sign of mental disturbance. The chief mental symptoms of neurasthenia are a want of will-power, indecision, sensitiveness to external impressions, hesitancy, and a want of confidence in self. Physically the patients are troubled with headaches, various subjective painful sensations, insomnia or disturbed sleep, muscular enfeeblement, want of nervous tone in the intestines, and consequently constipation, genital disturbances, and vaso-motor disorders.

The mental constitution of such cases predisposes them to the various episodic syndromes, chief among which are aboulias, obsessions, and impulses.

(*a*) *Aboulia* (*Inhibition—Folie du doute*).—This condition, which is very seldom met with in a pure and unmixed state, being usually associated with obsessions, phobias, and impulses of various kinds, is periodic in its nature. Preceded often by malaise of a more or less severe kind, by a physical illness or by a mental disturbance, it appears usually suddenly as a

paralysis of power to act in certain ways in which the person formerly was in the habit of acting. This paralysis of power to act may be in connection with trifling and unimportant incidents of everyday life, or may seriously affect the individual in the exercise of his profession. There are two forms of its manifestation: it is either an absolute inability to will to do certain things (*aboulia*) or an inability to decide, a fatal hesitancy determined by fear of consequences, or by the impossibility of determining a line of action (*folie du doute*). After a time the condition gradually subsides, and the subject recovers his freedom of mental action; but, like an attack of mania or melancholia, it is very liable to return. While it lasts, the mental state of the patient is one of distress and anxiety, which greatly aggravates this peculiar symptom, and often gravely implicates the general health. It is impossible to detail the endless number of such aboulias, for they may implicate any of the innumerable modes of human action. Magnan [1] records the case of a farmer's wife who after a short illness found herself unable to put eggs into a basket despite her most strenuous endeavour. The same patient saw her husband make a mistake in adding up his accounts, and on the occurrence of the idea to correct him was unable to speak or to move; on another occasion she saw a stable-boy push his barrow over a sleeping hen in the farmyard and kill it, but was unable to warn him, "nor could I have done so," she said, "if I had been witnessing the death of my husband or one of my children." Common enough are the milder cases, who are unable to decide very simple questions of procedure, such as when walking whether they should turn to the left or to the right, whether they should wear a particular article of dress or not. Still more common are the cases in whom simple actions committed become afterwards the subject of haunting doubt and anxiety. They worry usually over such trifles as whether they stamped a letter before posting it, whether it was properly addressed, whether they left a certain door open, or closed another door.

As has already been indicated, aboulias and doubts of a morbid character very seldom occur singly. So much is this

[1] Magnan, *Leçons cliniques sur les maladies mentales* (Paris, 1897), p. 44.

the fact that some French authors have described an affection to which they give the name of *Folie du doute avec délire de toucher*; for it is remarkable that doubt and aboulia are often followed by or accompanied with a fear of sharp or pointed instruments, such as knives, razors, pins, or needles, and by a dread of contact with metals.

When this malady of doubt assumes a complicated and acute form, the patient becomes in addition to his doubts and aboulias beset with obsessions and fears, sometimes with impulses of a dangerous kind. His condition may pass into one of hypochondria, and is in vain submitted for consideration to medical authorities, and subjected to all known forms of medication and ameliorative measures. From hypochondria it may even pass into melancholia. Such persons dread living, and dread dying, and are surrounded by so many elements which produce anguish, anxiety, and helplessness, that life is to them an intolerable burden. Nevertheless the majority of them recover; but the danger of recurrence of the same or similar symptoms must always be kept in view.

(*b*) *Obsession* is the sudden appearance in consciousness of an idea or group of ideas which interrupt the normal association of ideas, and which persist in spite of the resistance of the will. Such possessing thoughts are known as imperative ideas. It is asserted by some that the pathological variety is only an exaggerated form of thought-obsession to which all men are more or less liable, and there is of course ample illustration of this statement in the tendency which most men show at times to become haunted by a catch phrase, a slang expression, or a popular air. The pathological variety of obsession does not sit so lightly as the common experiences of mankind just alluded to. It may disturb normal ideation, cause mental distress, and vividly persist in spite of circumstances which might be supposed to be strong enough to overcome it. Ideas capable of arising in the human mind may become fixed, and constitute obsessions: consequently they are as numerous as there are human thoughts, and may refer to abstractions, words, figures, persons, or things. Notwithstanding their variety of form and character, they act

very similarly in their effect on the subject, possessing the mind suddenly, causing annoyance and distress, often preventing natural sleep, and disturbing nutrition.

Imperative ideas may be divided into those which are non-emotive and those which are highly emotional. Among the former are included the isolated appearance in consciousness of words, numbers, and phrases, or the necessity to count, to repeat words or formulæ, to place undue emphasis upon certain numbers, to touch various articles at certain times, to perform certain meaningless actions, or to prefer one course systematically without reason to another. No doubt many non-emotional obsessions are based upon habit and the faint relics of superstition. Such, for example, is the habitual preference for putting on the left shoe or stocking before the right, the preference for odd numbers, such as three or seven or their multiples, or the avoidance of the number thirteen. But others have no such foundation, and among them may be mentioned the habitual necessity for touching certain articles of furniture before retiring to rest at night, the counting of doors or windows in a street, or the walking carefully in the spaces between the lines on a pavement. Now, while the majority of non-emotional obsessions are harmless and unattended by any mental distress, or interference with health or occupation, any of them may in an ill-balanced mind attain to such magnitude as to completely overwhelm and temporarily cripple the subject. They do this not only by occupying all his attention by their prominence, but by destroying natural rest by their persistence, and by causing great distress if they are resisted, or if uncomplied with, by producing remorse and agony of mind.

Tamburini records the case of a man who was suddenly beset with a strong desire to understand the why and the wherefore of the circulation of bank-notes. He spent his days in its consideration; he grew thin and emaciated, and could not sleep, until finally hallucinations of bank-notes began to float before his eyes. Professor Ball records the case of a young man who, while listening to a conversation regarding the popular superstition about the number thirteen, was suddenly beset with the idea, "What if God were thirteen?"

This idea became agonising, and he could not rid himself of it, but kept repeating, "*Dieu treize! L'Eternité treize! Le Trinité treize!*" until he fell into melancholia.

The emotional obsessions are more fixed and more serious. Not only are they distressing in themselves, but they are accompanied by a disagreeable form of emotion, generally by that of fear. Hence the long list of "phobias," which include disgust, dread, or aversion of absurd and unnatural description towards many things, harmless and harmful.

The obsession of fear is one of the most distinct of the mental stigmata of the degenerate. Thus they may manifest dread of cancer, syphilis, fevers, hydrophobia, to such an extent as to cause them to live in a state of mental torture themselves, and to render them obnoxious to other people. So great is this fear of infection, of dirt, or of contamination, that it becomes a passion. Some of the patients spend their days in personal ablutions, especially of the hands. This obsession, with frequent long periods of intermission, tends, if not checked, or if the mind is much enfeebled, to become chronic and incurable. In the same category must be placed that class of the degenerate who manifest an insurmountable fear of wide, open spaces (agaraphobia), or of narrow contracted spaces (claustraphobia), or who cannot ascend a height without experiencing an irresistible tendency to throw themselves down. The strong aversion which some degenerates exhibit towards the company of their fellows and especially towards crowds, is merely another variety of the list of such obsessions, which might be interminably extended.

(*c*) *Impulse* may be defined as a morbid action or a series of actions accomplished by a perfectly conscious individual without, and in spite of, the intervention of the will. Impulse is led up to by obsession, so that the variety of insane impulses is as varied as that of fixed ideas. The inutility, therefore, of classifying the impulses into the host of so-called monomanias will be at once apparent, for it would require a list as large as there are ideas in the human mind that lead to action. There are, however, a few impulsive actions which, on account of their social and personal importance, demand special attention. These are (1) homicidal and suicidal impulses; (2)

the impulse to steal (kleptomania); (3) to drink (dipsomania); (4) to destroy things or set on fire (pyromania).

A true pathological impulse, then, is preceded by an obsession or fixed idea strong enough to call forth action. The sufferer is distressed at what he knows to be a powerful besetment, and the desire to act, opposed by the antagonism of his whole nature to its performance, produces intense anguish. The obsession, however, generally overcomes his resistance, and the act is committed. Following immediately upon the commission of the act is an intense feeling of satisfaction and relief, which is in turn followed by remorse for having committed it, should it be of a criminal or immoral nature.

Suicidal impulses are, more than any other kind of impulse, met with in ordinary forms of insanity; but we distinguish the true impulse by its being uncomplicated by any form of insanity, by its occurrence in a perfectly lucid mind, and because it is led up to by an obsession with all the mental distress that accompanies such phenomena. Impulse to suicide is especially hereditary, being transmitted directly, unlike other neuroses, from father to son (homologous heredity), and sometimes manifesting itself in both at the same period of life.

Impulse to homicide is also peculiarly attached to the degenerate constitution. The patients are beset with an idea to murder some person, often a person whom they love, such as a wife or a child. The sight of this person or of a weapon arouses within them the unnatural desire with all its accompanying mental torment. Some of them place themselves voluntarily under restraint to avoid the temptation, or take practical means to place themselves outside the reach of their abnormal passion. They feel that their wills are yielding to the power of the besetment, and when once they yield, the crime must follow. When the crime is committed, it may be our duty as physicians to investigate the mental state of the culprit. If the patient confesses to having done the deed, and explains his mental state, half the difficulty is overcome. Otherwise, we should study the family history of the criminal, search for the stigmata of degeneration, lay stress upon the

absence of motive, and, if convinced of the presence of an abnormal mental state, do all in our power to bring the medical side of the question forcibly before the minds of the judge and jury.

A tendency to steal may be met with in many forms of mental disease, in general paralysis, epilepsy, imbecility, and dementia. Here again we must distinguish between the true degenerate impulse and the foolish thefts of the technically insane. Impulsive stealing has certain points, apart from the presence of degeneracy—which you diagnose, as I have already more than once indicated—which are of importance to know. (1) The person may be rich and by no means ungenerous with his money, and may yet appropriate articles which are worthless in themselves and of no practical use to himself; (2) the articles stolen are generally of the same kind—handkerchiefs, ties, watch-chains, scarf-pins, books; and the patient may have an invariable tendency to fall a victim to one particular article every time he sees it. This point is also very important; (3) it is well to find out what the patient does with his stolen goods, *e.g.* does he accumulate them uselessly? Many similar points, which vary in almost every case, are most essential towards forming a diagnosis between ordinary theft and kleptomania. Of course the basis of diagnosis, heredity and degeneracy, must never be lost sight of.

Dipsomania is a condition characterised by irresistible obsession and impulse to drink, the attacks coming on with greater or less periodicity, and the patient being in the interval quite sober and penitent. It is strongly hereditary and, like suicide, is so in the direct line (homologous heredity). The presence of degeneracy, physical and mental, with the family history and the character of the drinking, is generally sufficient to make diagnosis easy. An attack may occur suddenly in a predisposed person of perfectly irreproachable character; but there may be exciting causes, such as moral shocks or strain, illness or physical shocks. As a matter of fact the attack is usually preceded by malaise or mental depression. Generally an attack lasts several weeks, often with short intermissions, during which the patient strives

with all his might in anguish to overcome his obsession. As the patient's circumstances and surroundings permit, the attacks become more or less frequent; if more frequent, then rapid physical and mental deterioration takes place, and the case becomes hopeless. In some very favourable cases, however, the patient may have only one attack in a lifetime.

The treatment should always be seclusion, where that is possible. During the attacks frequent warm baths, bitter draughts of a tonic nature, and the alkaline bromides may be given. As to general treatment it is essential to maintain the general tone and vitality of the system, for the patient is most liable to obsession when in feeble health. Magnan has recommended strongly the administration of arsenic in the form of the arseniate of soda, with cherry laurel water for general use, as a tonic by such cases. Hydrotherapeutics, with cold douches and shower-baths applied to the head and spine, should be continually used.

(*d*) *Perversion of Instincts.*—Among the insane instinctive perversions are very common during the course of attacks of acute mental disturbance. The natural affections are invariably modified; not infrequently they are distinctly perverted into antipathies and antagonisms. The instinct of self-preservation is changed in melancholia to one of self-destruction; in mania, general paralysis, and dementia, the ordinary human instincts of modesty, personal cleanliness, tidiness in dress, self-respect, and moral rectitude are profoundly altered, so that the subjects often sink in many of these respects to a lower level than that of the brutes. In those forms of mental alienation in which recovery takes place, the mental and instinctive faculties are simultaneously restored. From this we infer what is on other grounds equally apparent, that it is not instinct which is at fault, but the material basis which underlies the manifestations of consciousness. Instinct, as has previously been stated, is an instrument of the unconscious, all-pervading mind, and the Unconscious Mind never errs nor hesitates nor falters. When we speak of perversions of instinct, then, we mean a disordered condition of conscious cerebration, whereby instinct is diverted from its true purpose or even perverted into the opposite of its function. When

the melancholic commits suicide or the obsessed murder in response to an imperative idea, when the general paralytic eats his own excrement, or the maniac openly masturbates himself, or the pregnant neurotic woman swallows chalk, we readily attribute these instances of unusual conduct to cerebral disorder. Now, as there is undoubtedly insanity without intellectual excitement or disorder, so is there also instinctive perversion without any other apparent mental symptom. But the presence of defective or abnormal instinct is in itself the absolute proof of cerebral disorder, and no person who manifests an absence of or a perversion of an ordinary instinct can possibly be normally constituted or responsible for his conduct in that one respect. It might indeed with truth be insisted that moral insanity, moral depravity, eccentricities of conduct, criminality, and all deviations from normal behaviour constitute instinctive perversion, but in the interests of descriptive clearness this point need not be pressed. Among the episodic syndromes of the degenerate, sexual perversion, owing to its singular and abhorrent character, is, however, deserving of separate reference. Under the title "erotomania" have been placed a large number of anomalous sexual peculiarities of a pathological nature. These range from an abnormal desire for coitus, or habits of masturbation, up to indecent exposure of the person, rape of children, connection with dead bodies, pederasty, sodomy, and bestiality. Here we have to do with sexual obsession and impulse, either exaggerated abnormally or grossly perverted. The intellectual faculties may or may not be weakened. The underlying common factor in all the groups and the one that distinguishes them as pertaining to the class of the degenerate, is the besetment of the mind by the sexual idea, and the presence of an impulse which drives the victim to the commission of acts of an unnatural and highly dangerous character. The instinctive perversion is in this respect accidental and non-essential, the true element being the obsessional one. This fact is further proved by the comparative harmlessness of some forms of sexual fetichism which belong to the same category. In some individuals the sexual obsession and consequent gratification of the sexual passion is centred in an article of female attire, such as a shoe,

a garter, a petticoat, or chemise, and the efforts of the subject are entirely devoted not to the possession of the owner but to the acquisition of her garment. The same insane ardour has been known to be exhibited for a lock of female hair, which had to be stealthily cut from a woman's head in a crowd. Still more remote is the desire for certain kinds of fur, which in certain degenerates of both sexes appear to possess a distinct aphrodisiac effect. In the great majority of erotomaniacs the obsession is periodic, although there are others in whom it is more or less permanent.

Sexual inversion or homosexuality is a distinct variety in itself. The unfortunate victims are fully aware of their unnatural disposition, and most of them deplore it and struggle against it, while others defend their conduct as being the involuntary product of their constitution. The laws of most civilised nations regard this symptom of degeneracy when actively present as a criminal offence requiring severe repression. Consequently the subjective feelings of victims of the malady are painfully strained between desire on the one hand, and the dread of social disgrace and criminal prosecution on the other. So much is this the case, that many inverts of higher intelligence end their misery by committing suicide. There appear to be three clinical forms of sexual inversion. In the first form the patients are weak-minded and liable to various kinds of mental disturbance, including especially systematised delusion, mania, and melancholia. They usually present in profusion the physical stigmata of degeneration, and are particularly subject to sexual obsessions, attended by visual hallucinations of genital organs and lascivious dreams corresponding to their obsessions. Among such cases may be classed those idiots and imbeciles in whom sexual inversion is a prominent symptom. The second form embraces a class of persons who physically present the features of the opposite sex. The females are masculine in voice and bodily conformation, and their habits and proclivities are those of the male sex. The men are feminine in build, presenting the broad pelvis and enlarged mammæ of the female; the beard is awanting or scanty, the voice high-pitched, and the skin smooth and hairless. From childhood they prefer female to

male society, and their pursuits and recreations are those chiefly indulged in by women. There can be no doubt, as Magnan states, that the nervous systems in such cases are transposed, the male organisation possessing a female nervous system, and *vice versâ*. In the third and last form the subjects are well developed, physically and mentally. Many of them are endowed with high intelligence, and there is nothing apart from a history of nervous heredity, which is almost always present, to distinguish them from normal individuals. Yet the sexual instinct is generally from puberty abnormal, and they show a strong disinclination to gratify it in the ordinary way. There are others in whom homosexuality is undoubtedly acquired as the result of vice and inordinate masturbation in early life; but the true sexual instinct has in such cases probably been always perverted, and it may be questioned whether in ordinary healthy surroundings sexual inversion can be acquired as a vice in the absence of profound instinctive disorder.

Treatment of the Episodic Syndromes.—It will be apparent that no form of treatment can directly affect the dominance of an obsession or of an impulse, and we can only indirectly react upon these conditions by attempting to remove the underlying neurasthenia which is constantly present. Neurasthenia reveals itself not only by the weakened cerebral state which permits of the presence of such symptoms, but also by gastric disorders, genital troubles, especially in the female, neuralgias, and anæmia.

Insomnia and want of appetite must be overcome by suitable remedies, and the whole nervous system strengthened by administering quinine, strychnia, arsenic, or some such tonics. Uncongenial or exhausting employments must be replaced by work of an interesting kind and recreations which exhilarate and distract the attention. Finally, the moral guidance of the case is most important of all. The patients must be encouraged, and a good hope of recovery held out to them, for, remembering the extraordinary versatility of the ideas in the degenerate and the periodicity of their symptoms, such a hope is by no means illusory.

V. *Systematised Insanity in the Degenerate.* (*Paranoia*

Degenerativa).—The description already given of Paranoia need not here be repeated. It will suffice to mention cursorily the prominent features of that affection in the degenerate. The constitutional anomalies, mental and physical, as well as the emotional and moral disturbances in the degenerate, become more exaggerated in the period immediately preceding the appearance of systematised delusion. The symptoms of this insanity are also frequently preceded by obsessions, impulsions, hysteria, hypochondria, or by attacks of mania, melancholia, or stupor. The disturbances may manifest themselves at a very early age, sometimes at puberty, often at adolescence. In other cases, the young subjects are a source of great anxiety to their relatives and guardians on account of their waywardness, restlessness, and irresponsible actions. Some of them present a moral obliquity, an extreme sensitiveness to impressions, especially sexual impressions, or they may be unreliable, fickle, and hypocritical. Others, again, manifest a cerebral debility, which tends towards nerve exhaustion and mental depression.

The occurrence of delusional insanity in such cases may be slow and insidious, or quick and explosive. In the first instance the patient is generally a recluse, and reasons out his own symptoms step by step, or he consults books of every description, from which he culls irrelevant passages, which he believes to have a bearing on his own case.

The symptoms present themselves in three distinct forms.

(1) The commencement may be ambition, with delusions of exaltation. A patient who has previously been reticent and shy may all at once be convinced that he is born to great things and with a special destiny. Almost all the subjects deny their parentage and assign to themselves noble origin. Yet these insane ideas have little reality and little root, and furnish but a very short-lived satisfaction, as the subjects begin to feel that they have no effect on real life.

Then in the same unconscious and insidious manner delusions of persecution tend to be added to the ideas of grandeur. The patient believes that his name or his exalted position renders him an object of suspicion and hatred to others, who by plotting deprive him of his rights; and from

that point he goes on to formulate a regularly systematised insanity of persecution.

(2) Delusions of persecution may manifest themselves first of all. They appear to originate very much after the nature of imperative ideas, and are usually produced without the aid of hallucinations of any of the senses, which come on as a rule later in the course of the disease. They in their turn are followed by delusions of pride and grandeur and an ambitious insanity.

(3) The two forms (persecution and ambition) may burst out simultaneously, progress side by side, and succeed each other alternately, causing periods of depression and of exaltation.

The hallucinations generally tend to aggravate and accentuate the disease, and to confirm the insane beliefs in accordance with their nature. The patients who suffer from hallucinations of hearing generally hear good, bad, or mixed voices; in the last case the different voices are often referred to opposite ears.

The character of the insanity varies also according to the intellectual development of the patient. When the patient is of limited intelligence, the delusions are usually ridiculous and absurd; but when the intelligence is of a higher order, they correspond more to the symptoms of a case of a true persecution mania. Then the patient is somewhat reticent regarding his symptoms; his ideas approach more nearly to probability; and their extravagance depends to a large extent on the convictions born of false sensations and hallucinations. When the progress of the malady is slow and chronic, the symptoms are less prominent, but the insanity is nevertheless the more firmly systematised. It is not unusual to observe intercurrent attacks of mania and melancholia—the latter of a hypochondriacal kind.

The preceding account of paranoia in the degenerate reveals the fact that it is an extremely varied and variable form of insanity. The variability is no doubt to a great extent due to the exceedingly unstable mental constitution of the patients. The terminations of the affection are also numerous. Sometimes the cases pass through a whole series

of changes—ambition, persecution, with recurrent maniacal, melancholic, or stuporose attacks—and ultimately recover. In others the character of their symptoms frequently change and end in dementia. Others again pass through a metamorphosis from ambition to persecution or *vice versâ*, and remain in the latter phase until recovery or death.

Prognosis.—It is unnecessary to state that in such a hydraheaded group of insanities, prognosis must be a matter of extreme difficulty. Generally speaking, the prognosis is usually unfavourable, although there are exceptions. The more acute the symptoms, the more rapidly the insanity changes; and the more frequent is the admixture of acute general conditions, such as mania and melancholia, the more favourable is the prospect. Conversely, the more chronic the symptoms are, the more unchangeable the insanity; and the more confirmed the cerebral condition which underlies all symptoms, the more unfavourable the prognosis. The great physical danger is phthisis pulmonalis, of which disease a large proportion of the patients die.

VI. *Folie à deux.*—This is a condition in which one insane person communicates his delusive ideas to a second person. The communicator is termed the active agent, and the person to whom the insanity is communicated is termed the receptive agent. It is necessary that the active agent should possess fixed delusions of a not too improbable nature. These delusions must be of a semi-personal nature, and refer to some train of emotion which includes the sentiment of fear or of hope. It is also necessary that the two persons should be closely associated by relationship or sympathy with one another. These relationships generally are those of mother and son or daughter, sister and sister, husband and wife, or mistress and servant; for it is essential that the active agent should stand in some position of authority, either mental or social, to the passive agent. The passive agent is generally of feeble intelligence, very docile or very young, or possesses a common, though subordinate, interest with the active agent. The transmission of insanity from one individual to another seldom occurs from a person fully insane to a person of sound intellect. Therefore it is the systematised insanity, especially

that of persecution, which is most frequently communicated. The passive subject generally resists at first the inception of the false ideas; but little by little he yields to conviction, and finally accepts them, sometimes in a modified form, but often identically the same as when presented to him. A variety of the affection has been termed simultaneous insanity, where without undue influence of the one upon the other, a parallel train of circumstances or a similar physical and nervous constitution, as in the case of twins, produces a simultaneous appearance of identical insane ideas in two or more persons.

In *folie à deux* it is not always easy to determine which is the active and which is the passive agent, for it often happens that both are equally convinced of the reality of the delusions. It is only by separating the two that a satisfactory diagnosis can be arrived at. When this is done, the passive subject as a rule rapidly recovers, while the active agent pursues the chronic course of the malady. In the variety called simultaneous insanity the distinction becomes more difficult; but it may always be assumed that the person with the stronger will and intelligence is the originator.

With regard to prognosis, it is evident that in the case of the active agent it must be very grave. In the passive agent, on the other hand, apart from any congenital mental enfeeblement or other extraneous circumstance, the prognosis is much more favourable. In simultaneous insanity the prognosis is usually unfavourable in both cases.

CHAPTER XVII

INSANITY CONNECTED WITH THE NEUROSES

I. *Epilepsy.*—Epilepsy is a disease characterised by convulsions of a definite type, or by a peculiar and periodic sudden loss or impairment of consciousness. In most cases there is no visible organic lesion of the brain, and the epilepsy is then termed idiopathic. In other cases similar convulsions are apparently the result of well-marked lesions, such as localised softenings, tumours, meningeal thickenings, and local sclerotic changes of the cortex.

Epileptic attacks are divided into two kinds, viz.: the major or severe fit (*grand mal*) and the minor or slight fit (*petit mal*). In the former there is loss of consciousness and severe muscular spasms; in the latter there is usually slight and temporary loss of consciousness, with either no spasms or a very slight, limited convulsion. In the severe form the patient falls to the ground, and is violently convulsed; in the milder form the patient does not usually fall: he is suddenly overwhelmed with mental cloudiness or darkness, as the patients frequently term it; but after a few seconds he is often able to continue the work in which he had been engaged at the time of seizure. These two forms of fit are usually combined in the same individual.

A third form of fit (local spasm) has been described by Dr. Hughlings Jackson of London, after whom it is called universally "Jacksonian Epilepsy." It may or may not be associated with some form of organic disease of the brain, such as a local sclerosis, local softening, tumour, a spicula of bone pressing on the cortex, or disease of a group of nerve cells.

The spasm may be limited to one muscle or group of muscles, to one or two fingers, to an arm or a leg, or one side of the face, without loss of consciousness. If allowed to continue without intervention, the area of the spasm tends to enlarge, until it gradually involves the muscles of one side of the body, when consciousness may or may not be lost, and extend to the opposite side, thus involving the whole body, when consciousness is lost, and the fit becomes generalised.

Mental Symptoms.—The general mental state of epileptics is distinctive, although some of them exhibit during the inter-paroxysmal period a comparatively normal state of mind. No emotional or intellectual disturbance is manifest, and they are able to pursue their usual employments with care and responsibility. Such cases are usually met with outside asylums. As a rule the more frequent the fits, and the longer the period of their existence, the greater is the tendency towards mental deterioration; but the class just mentioned proves the exception to this rule. Among the so-called insane or markedly degenerate epileptics, on the other hand, the inter-paroxysmal period is usually free from any manifestation of insanity; but the degeneracy is exhibited by certain oddities and eccentricities of conduct, want of self-control, and instability of the emotions. Most of these cases are hypochondriacal, and engrossed not only with their bodily sensations, but also with their passions, feelings, and sentiments. They exaggerate any light, bodily infirmity, and constantly demand medical attention and treatment. In addition they are usually vain, self-laudatory, and narrow-minded. At the same time, and co-existing with the symptoms mentioned, the patients are usually obsequious, pleasant, and agreeable in their manner, and very willing to work. They are extremely kind to one another, and although they quarrel fiercely, they sympathise with and care for their fellow-sufferers, especially during the time when these are taking fits. Most of them exhibit an openly-professed religiosity. They ostentatiously pray, read their Bibles, and sing hymns. In many cases there can be no question of the profundity of the religious feeling; but unfortunately the religious emotion is stronger in them than the intellectual grasp of religious principles.

This religious emotionalism is more or less a characteristic of mental degeneracy, and by no means limited to epileptics. Religion in such cases takes the form of fetichism, and in all fetich worship the ritual is more important than the spiritual element. Add to this the intense egoism of the degenerate, which is especially prominent in epileptics, and we have before us an analysis of the extraordinary uniformity of the pseudo religiosity of this class. The strong sexual proclivities of epileptics have been pointed to in explanation of their religious sentiments, and some writers have laboured to derive the two from the factor of self-sacrifice which is common both to religion and procreation. This to my mind is a far-fetched and quite unsatisfactory theory. It is amply sufficient to know that the three elements of egoism, fetichism, and strong sexual passion are symptoms of the ill-regulated mental state of the degenerate as a class, and that they do not necessarily co-exist in the same individual.

Epileptics are almost all passionate, and when angry ungovernably furious and impulsive. They are devoid of self-control in matters of conduct, which, notwithstanding their religious profession, is apt to be very improper whenever occasion permits. They are peculiarly addicted to alcoholic and sexual excesses. A certain small number differ from the above description, being always irritable, morose, and unsocial, and do not even fraternise in asylums with other epileptics, the usual custom being for that class to form themselves into groups for mutual sympathy and offensive and defensive purposes.

Insanity of Epileptics.—The mental disturbances are most commonly observed either immediately preceding the epileptic fit, immediately succeeding it, or replacing it. The latter form is designated larvated, or masked epilepsy. Of all the forms of insanity accompanying the fit, either before or after it, mania is the most common. The kind of mania varies, not only in different cases, but very markedly in the same cases at different times. From mere irritability and irascibility, with capricious conduct, it may extend to the most violent excitement, incoherence, and fury. Further, mania does not always accompany the fits in the same person, who may for

long periods have regular epileptic convulsions without manifesting any mental disturbance whatever. Epileptic mania has a special tendency to assume a furious and impulsive character. The insanity may occur quite suddenly, and acts of violence may be committed of which the patient retains afterwards no recollection. As a general rule this form of furious mania, with impulsive acts which may be homicidal, suicidal, or destructive in other ways, generally succeeds the epileptic seizure. It is usually of short duration, occasionally lasting not more than a few minutes, more commonly a few hours, and it very rarely continues more than three or four days. The mental symptoms disappear with great suddenness. It is important from a legal point of view to remember these facts, as not a few crimes of a serious nature are performed during post-epileptic furore. In the pre-epileptic mania the insanity comes on more gradually, which it is important to remember may also occur in some of the post-epileptic cases. Before the fit there is almost always irritability of temper, with change in the ordinary mental disposition. The patient either becomes taciturn and moody, or exaggeratedly gay and noisy, laughing immoderately and behaving like an intoxicated person. These symptoms lead gradually up to a fully-developed mania, sometimes of a gay and expansive character, at other times with irascibility, impulse, and violent conduct. The actions are automatic, and there remains no after-consciousness or memory of the condition beyond a vague feeling of having passed through some turbulent agitation. Attacks of epileptic mania in the same individual resemble each other closely, and the symptoms are reproduced exactly in each succeeding attack.

Epileptic seizures may be followed by stupor or by melancholia. Epileptic stupor is more persistent and of longer duration than epileptic mania. There are usually hallucinations of a terrifying nature, and a tendency to automatic and impulsive actions. The stupor usually corresponds to stupor of the second degree (melancholic stupor). When melancholia occurs in epilepsy, it is not an accidental or passing episode, connected with the fits, like mania, but a progressive, chronic, and generally incurable condition.

Clouston describes it under melancholia as convulsive melancholia. He says "the mental depression is very intense, accompanied by a muscular agitation and excitement, and usually with great obstinacy. There is a tendency to skin irritation, so that the patients scratch themselves and pick holes in their skin, or rub off their hair and pull it off in patches."

Under the influence of repeated attacks of epilepsy, the mental faculties tend to become enfeebled; the patients become gradually more and more demented; their movements lose energy, and the facial expression reveals a condition of mindlessness. Sooner or later all prolonged cases of epilepsy tend towards this condition, generally known as epileptic dementia. Generally speaking, the younger the age at which the epilepsy occurs, the greater is the tendency to mental enfeeblement. When it occurs in infancy and childhood, it arrests brain development, causing idiocy.

Larvated Epilepsy.—When automatic action, with loss of consciousness, strange and unaccountable conduct, followed afterwards with complete loss of memory of what has taken place, occurs in individuals known to be epileptic, it is termed larvated epilepsy. This form of insanity may occur independently of the convulsive seizures, often replacing them, and it may recur with the same periodicity as marks epileptic attacks generally. The symptoms of such an attack are intellectual anomalies, strangeness of conduct, violent language, and troublesome impulses, with or without hallucinations. Frequently the patients are seized with an automatic impulse to walk on straight before them without any end in view, and without any sense of direction. Generally they use the same words, perform the same acts, and are subject to the same impulses on each recurring occasion. The attack comes on suddenly; the actions are generally violent; and not infrequently there is marked tendency to homicide or suicide. The attack lasts a very short time, generally a few minutes, seldom more than three or four days. The occurrence of such attacks as have been described is presumptive evidence of their epileptic nature; but it is scarcely permissible to diagnose epilepsy in the absence of any history of convulsions.

If convulsions have not previously occurred, they will generally present themselves before long, if the case is carefully watched. Epileptic fits may occur during the night, and the patient himself may be unconscious of their existence. It is well in such cases to examine the patients carefully when larvated epilepsy is suspected. If this is done, it will often be found that the tongue is bitten, or that urine is passed involuntarily in bed. Such patients also experience headache, or a feeling of lassitude and muscular pain on awakening in the morning.

Ætiology.—Epilepsy is undoubtedly predisposed to in the great majority of cases by neurotic heredity. It forms the outstanding example of the transmutability of the neuroses in their transmission from one generation to another, for the heredity is rarely homologous. Among the antecedents and collaterals are to be found especially insanity, alcoholism, syphilis, and phthisis; epilepsy itself very rarely.

Insanity is not necessarily combined with epilepsy in the same individual; on the contrary, many epileptics never become insane, and it is certainly worthy of remark that this affection has been associated with some of the best-known names in history. Among many may be mentioned Mahomet, Julius Cæsar, and Napoleon Buonaparte. The occurrence of epileptic insanity appears to depend upon the age when the fits first manifest themselves, upon the nature, frequency, and severity of the convulsions, and upon the cerebral resistance of the individual. Beginning with the last first, there can be no question that a predisposition to insanity, which includes cerebral weakness, is a fact of the first importance in the causation of mental aberration in epilepsy, for otherwise all epileptics would necessarily become insane in virtue of the neurosis. We can only conclude therefore, that though epilepsy is always an episodic syndrome and stigma of degeneration, the subjects of the special insanities connected with it are still more degenerate. But apart from predisposition to insanity, the fits, if frequently repeated and very severe, have a tendency to induce mental deterioration. This mental change is usually one of dementia of varying degree, with loss of memory, stupidity, irritability, ineffectualness, and apathy.

Accompanying the fits may occur any of the many forms of acute insanity which have been already alluded to. When epilepsy occurs prior to puberty, it is almost always attended by mental deterioration and insanity at regular or irregular periods. It is most probably the case that the common underlying cause of the convulsions, of the cerebral parenchymal changes, and of the insanity, exercises a more baneful influence upon the young than upon the adult brain, and thus checks mental development.

In this connection the age at which epilepsy first occurs becomes an important point in the ætiology of epileptic insanity. According to Gowers, an eighth of all cases commence within the first three years of life, nearly one-half between ten and twenty, and about three-fourths under twenty years of age. Not more than a fifth of the cases occur after the age of twenty, and after thirty there is a very marked and rapid diminution up to sixty.

Sex does not appear to be an ætiological factor of any consequence.

When we come to the consideration of brain disease and lesions, we are dealing with causes of the greatest interest and importance. There is no form of gross brain lesion, wherever situated, but especially if located in or near the motor regions, which may not form the starting point of an epilepsy. On the other hand, all kinds of brain injuries, clots, softenings, and neoplasms, may be met with in the brain without convulsions. Again, the surgical removal of a gross brain change causing a "discharging lesion" may and often is followed by cessation of the convulsions; sometimes it is not so. We meet with idiots presenting all forms of paralysis and cerebral malformation, who are epileptics, and with others presenting very similar malformations, who are not.

Exciting causes present the same anomalous want of uniformity in their action as do pathological brain changes. Blows, traumatic injuries of the head, and sunstroke, are undoubtedly causes of great importance. Acute diseases, especially typhoid and scarlet fever, intestinal worms, difficult dentition, delayed or disturbed menstruation in girls, and masturbation in boys, have been accredited with causing

epilepsy. Among all exciting causes, however, an important position must be given to moral shock or fright in childhood, although there is usually a long interval between the fright and the occurrence of the first fit. The connection has been too well established clinically to permit of doubt as to the effectualness of this cause. When the fit occurs very soon after the fright, it is believed by Gowers and others that the fit is more likely to be hysterical than epileptic. We have seen that one of a host of diverse causes may originate a condition characterised by convulsions, and most often followed by serious mental impairment. It is now necessary to inquire into the nature of the process.

The Pathology of Epilepsy.—The seat of the epileptic discharge is generally the cortex cerebri. Irregular epileptiform convulsions have been induced experimentally in animals by irritations of the pons and medulla; and pathological changes in other parts of the brain besides the cortex are attended with convulsions. But in idiopathic, Jacksonian, and hystero-epilepsy the cortex of the brain is always the seat of origin of the convulsions. In Jacksonian epilepsy this is abundantly evident from clinical and pathological observation. Moreover, it has over and over again been shown that direct electrical stimulation of the cortex may be followed by fits. In idiopathic epilepsy the phenomena of the fit—tonic spasm followed by clonic spasm, the cry, the respiratory changes, the unconsciousness and the intense accompanying hyperæmia of the cortex—are certain indications of this fact.

What, then, is the direct cause of these phenomena? Some years ago Magnan found that by injecting one minim of the essence of absinthe into the venous circulation of an animal he was able to induce a true epileptic convulsion. This was amply confirmed by Horsley by experiments continued over many years. Since then several workers, including Mairet, Bosc, Féré, Voisin, and Peron, have directed their attention to the toxicity of epileptic urine, and have shown that it varies in its convulsant powers, being practically harmless in the inter-paroxysmal period and most toxic at the time of the fit. Féré has demonstrated that the urine withdrawn after a fit, which corresponds to the kidney excretion imme-

diately before or during the fit, was highly convulsant, and induced true epilepsy when injected into mice or rabbits. Another series of experiments was made by Haig, who showed that the amount of uric acid excreted was always markedly diminished for one or two days prior to the fit. So constant was this condition that Haig was able to foretell with certainty the time of the occurrence and the severity of the fit by observing the degree to which uric acid was retained. These observations of Haig were fully confirmed by Krainsky of Cracow, who satisfied himself of the fact that this diminution usually occurs from twenty-four to forty-eight hours prior to the fit. If 0·6 to 0·8 grms. of uric acid are excreted daily, no fit takes place; but if the daily quantity excreted falls below 0·45 or especially 0·35 grms. a seizure is usually to be expected with certainty on the third day. In other cases the fall in the excretion takes place gradually over several days. Further, a certain relation may be determined between the lessened quantity of uric acid and the number and severity of the seizures. We have now obtained sufficient confirmation of the fact that epilepsy is most probably the result of a toxin periodically liberated within the organism. What is the nature of this toxin? Haig believes it to be uric acid. Krainsky disagrees with this opinion, and carries his argument and research further. He regards the pre-epileptic diminution in the excretion of uric acid to be not an indication of increased retention of that substance or of its toxic effect on the nervous system, but an indication of a diminution in its formation, and consequently of a disturbance of the body metabolism, whereby, instead of uric acid, an intermediary product of a highly toxic nature is formed, which, when it accumulates in a sufficient quantity, culminates in a seizure. The almost invariable increase in the quantity of uric acid excreted after the fit points to the suggestion that the convulsion is instrumental in restoring the normal course of metabolism, and stopping the further formation of the toxin. The toxin is very unstable chemically, and easily decomposed. As a test of this theory, he injected into rabbits the defibrinated blood of epileptics, extracted during a seizure, with the result that true epileptic fits were always produced

within a few minutes, followed by paralysis of the posterior extremities. These fits were periodically recurrent for four or five days, after which the animals died in coma. The interparoxysmal blood of epileptics, when injected into animals, was harmless. Nencki and Pawlow had previously made experiments on animals by establishing a fistula between the inferior vena cava and the portal vein. Animals thus operated on soon showed toxic symptoms—excitement, confusion, epilepsy, coma, and death. Carbamic acid in the form of carbamate of ammonium was found in their blood and urine. Experiments were then made with carbamate of ammonium injected into animals, when symptoms identical with those following the use of the blood of epileptic patients were observed. Carbamic acid and ammonia both exist in excessive quantity in the blood of epileptics, as shown by analysis. Carbamic acid and ammonia exist normally in small quantities in the blood of healthy persons, and in considerable quantity in the blood of dogs. Uric acid is theoretically formed by the synthesis of urea with the derivative of an organic acid—parabamic acid. Now, carbamate of ammonium occurs at the expense of that part of the urea which enters into the formation of uric acid, and which, on account of the altered condition of metabolism in the epileptic's organism, undergoes change in that it takes up a molecule of water, forming carbamate of ammonium. Thus the diminution in the excretion of uric acid before the fits and its increase after them by the synthesis of the organic acid and urea into uric acid is accounted for. Such is Krainsky's theory, which yet fails to explain the whole process in that it does not account for the periodic production of auto-intoxication, a fact which suggests the presence of some kind of ferment. It brings us, however, nearer a conception of the toxic condition, which must be admitted to underlie the phenomena of epilepsy.

The foregoing theory applies only to idiopathic epilepsy, and does not at first sight include traumatic or organic epilepsy, in which there is a focal cortical lesion. But it is very possible that in most cases organic epilepsy differs in no way from the idiopathic form, and that the lesion is only a

predisposing factor on the basis of which the genuine epilepsy is developed, exactly in the same way as a tuberculous joint follows an injury.

Histological Pathology.—So far as is yet known, there are no microscopic *post-mortem* appearances in the nervous system which are pathognomic of epilepsy. Apart from the host of gross focal lesions which may start a chronic epilepsy, or the theoretically assumed changes in a group of nerve cells originating a "Jacksonian" epilepsy, which latter may gradually pass into a general epilepsy, we know of no changes in the brain invariably associated with the phenomena of this disease. In idiopathic epilepsy, hystero-epilepsy, and in many Jacksonian epilepsies, the brain tissues manifest no distinctive pathological changes. It has often been attempted to found a pathology upon anomalies in cerebral development, asymmetries of the cerebral lobes, deficiency in convolutions, and irregular vascular supply. All these are, however, merely indications of degeneracy, which are present in some epileptics in common with other classes of the degenerate. The same may be said of the various forms of cerebral neoplasm, meningeal thickenings, apoplexies, and softenings, which occur at all ages of life with and without epilepsy. They are common to epilepties and non-epileptics, although in the latter they undoubtedly form the starting-point of the affection.

The secondary changes which occur in the cortex in those cases in which the epilepsy has been of long standing, and in which the fits have been severe and the mental deterioration well marked, are, however, important. They are undoubtedly the result of the prolonged action of the toxin upon the nervous and non-nervous structures of the brain. These secondary changes in epilepsy are, however, much less marked than in general paralysis or chronic alcoholism, and are in all respects similar to the changes met with in chronic insanity.

The nerve cells present varying degrees of chromatolysis of irregular distribution. Bevan Lewis has described vacuolation of the nucleus of the cells in the second layer of the cortex as being often present in epilepsy; but this change is not always apparent. The neuroglia elements are increased,

and in the majority of cases there is a thick subpial felting due to their processes. A slight degree of neuroglia hypertrophy is present in the outer layers of the cortex and in the white matter generally. Beyond slight tortuosity and occasional aneurysmal distention, the blood-vessels do not show any great abnormality; the neuroglia elements attached to them and the nucleation of their adventitia are not nearly such prominent microscopical features as in general paralysis or alcoholism. Sclerosis of the cornu ammonis and of other parts of the brain has been described as an essential change in epilepsy; but while its presence in some cases may be admitted, its pathological significance is unimportant.

Treatment.—The treatment of epileptic insanity is in many respects the treatment of epilepsy, for the two are but phenomena of one common cause. In the great majority of instances the subjects of mental disturbance connected with epilepsy require isolation from ordinary social life and separation from their relatives, in order to shield them from irritations, temptations, casualties, and the result of their unconscious automatism. Unfortunately there is no way of disposing of them at present except by sending them to ordinary asylums, where they are discontented and are the source of much trouble and anxiety to others. Associations are now being formed in this country with the object of providing epileptic colonies on the model of the great colony of the same kind at Bielefeld, near Hanover, where upwards of 2000 epileptics live under conditions as far as possible suited to their mental and physical welfare and happiness.

Medicinal treatment is practically limited to the administration of the bromides. There can be no question that, of these, bromide of potassium, in the absence of any distinct contra-indication to its use, is the best and the most effective. It should be administered constantly, without intermission for a single day, and although the dose must vary with circumstances, it will be found that 30 grains three times a day after food is the best average dose. The administration is attended with certain disadvantages, such as acne eruptions, gastro-intestinal disorders, mental obfuscation, and physical weakness. To counteract the first disadvantage it is usual to

combine the bromide with a small quantity of arsenic (2 minims of Fowler's solution to the dose), but perhaps a better drug, and one which also relieves and prevents the troublesome gastro-intestinal disorders, is salol (3 to 5 grs. to each dose) or benzoate of soda (6 to 10 grs.). These drugs help to check putrefactive processes in the stomach and intestines.

When the patients show mental confusion under the influence of bromide, the dose should be reduced or stopped for a few days. When physical weakness manifests itself, much benefit may be obtained from regular cold bathing at a temperature suited to the patient's strength, coupled with the gentle application of the cold douche to the head and spine.

Flechsig's treatment is undoubtedly of service in the younger and less chronic class of patients, and has been known to remove the epilepsy (consequently the insanity) altogether. It consists in the exhibition of the tincture of opium, commencing with minute doses (3 to 5 mins.) three times a day, and gradually increasing them daily until 90 to 120 mins. are given daily. The opium is then either gradually reduced or suddenly stopped, and after its cessation large doses of the bromides are given for six weeks, after which they are gradually diminished to nothing or suddenly stopped. It is better to confine the patient to bed during this treatment.

The bromides have a sedative effect upon the nervous system, reduce the number of the fits, allay the tendency to insanity, and relieve the nervous irritability. Under their influence the individual, like the nerve cell, becomes less explosive. Krainsky, in pursuance of his theory, suggests another effect. He points out that the bromide of potassium, which enters the system in the form of the bromide of sodium, is eliminated as the bromide of ammonium. It would seem then that the bromide of sodium and the carbamate of ammonium readily exchange bases in the organism, and that thus the toxicity of the former is largely checked.

One form of treatment out of very many which must be left unmentioned appears to me so deserving of trial by young epileptics that I must refer to it. It is greatly insisted upon by Haig, and has undoubtedly been the means of curing some cases. It consists simply in the elimination from the dietary

of all forms of animal food and all stimulants, such as alcohol, tea, coffee, and tobacco. The abstention from animal food relieves the overburdened metabolism of the epileptic, and enables it to adjust itself to its normal requirements by reducing uric acid and its progenitors.

From what has preceded it will be evident that epilepsy is not a nervous disease as that designation is usually understood, but a metabolic affection, and that its therapeutic treatment, to be successful, must be directed to the metabolism of the organism.

II. *Hysteria.*—This neurosis is dependent upon a derangement in the higher cerebral centres, with secondary implications of the lower brain centres, the spinal cord, and the sympathetic nervous system. It is much more common in the female sex and between the ages of twenty and thirty. It manifests itself either as a continuous nervous state or paroxysmally. The mental syndromes of hysteria are usually well marked, and are characterised by defective will-power, want of self-control, and a tendency to impulsive action. In addition to these symptoms there are others of an equally important nature, irritability of temper, self-consciousness, a craving for sympathy, and an instability of the emotions.

On the sensory side of the nervous system there is distinct hyperæsthesia; spots of tenderness are found in various localities all over the body, accompanied by pain on pressure. Among the most common seats of tenderness are the ovarian region, the upper, middle, or lower dorsal regions, the hypochondriac regions, the inframammary region, and spots on the front of the abdomen and thorax. Hyperæsthesias of the special senses, including intolerance of light and sound, are commonly present.

Diminished sensation or absence of sensation, in the form of hemi-anæsthesia, which may change from one side of the body to the other, is met with in some cases. This loss of sensation may be complete or incomplete, that is to say, the sensation may be lost, and that of pain only diminished, or both may be only slightly affected, or the distribution of the anæsthesia may be partial. The organs of special sense, especially those of hearing and of sight, may also be implicated

on the same side of the body as the anæsthesia. On the motor side paralysis is a common symptom, and may affect almost every muscle in the body. The vocal cords may be paralysed, causing aphonia; paralysis of the limbs may assume the form of hemiplegia, paraplegia, or ataxia. Gowers remarks that in this country paraplegia is more common than hemiplegia.

Among the spasmodic motor affections, which are extremely various, two leading groups demand notice, namely contractures and convulsions. Contracture, which commonly succeeds an hysterical fit, is a condition in which the muscles become rigid, and fix the limb in a certain posture for a longer or shorter time. The contracture persists during ordinary sleep, and is only relaxed when the patient is thoroughly under the influence of chloroform. In the more persistent and rarer forms, which extend over years, the contracture returns after the patient has passed out of the chloroform. In these contractures there is very little atrophy of muscle, but according to Charcot, changes in the spinal cord may result from the prolonged functional disturbance, and after years of chronic spasm, sclerosis may occur in the lateral column of the cord. In the convulsive form tremor is a very common accompaniment, also local muscular convulsions, irregular spasms of the limbs, and regular and irregular rhythmical movements. In the major form of convulsion, known as hystero-epilepsy, the onset of the attack is attended with sudden loss of consciousness, general tonic spasm, and clonic spasm, followed by coma as in an epileptic fit. After a brief interval the second stage or co-ordinative spasm follows, with opisthotonis, bounding movements of extreme violence, succeeded by a stage of mental excitement, with incoherent talk, ecstasy, rage, or erotism. Tenderness in the ovarian region is almost always present, and in the typical cases the fit can be induced or suddenly arrested by pressure on one of the ovaries. There is a minor form of convulsive attack, attended by manifestations of emotion of various kinds, associated with violent movements of the limbs, sometimes purposive, and sometimes purposeless, but without unconsciousness or the symptoms of true hystero-epilepsy.

Various disordered physical symptoms, such as dyspepsia,

false angina pectoris, dyspnœa, retention of urine, and the passing of large quantities of pale limpid urine, and vaso-motor disturbances, especially of the extremities, are frequently met with in hysterical subjects. The polyuria generally occurs after the hysterical fit.

Mental Symptoms.—Insanity and hysteria are complicated in their relationship. As in epilepsy there may be no mental alienation, so in hysteria; but while in the former the severity and frequency of the fits have a powerful influence in determining mental deterioration, the fits in hysteria do not conduce in any way to the same end. This is also apparent in the somatic effect of the fits in the two neuroses. For instance, the *status epilepticus* is always attended with a serious elevation of temperature, while in hysteria the temperature during a prolonged series of attacks without intermission either does not rise at all or very slightly. This remark does not of course apply to the phenomenal and unprecedented rises in temperature which are occasionally met with in hysterical subjects, and which are usually harmless.

Hysteria is a neurasthenic condition, and as such may complicate any neurosis, including insanity. So it happens that the acute idiopathic insanities, mania and melancholia, are not infrequently, especially in females, preceded by true hysterical attacks, which gradually shade off into the regular symptoms of insanity. Again, there is almost no form of mental affection that may not occur in hysteria. Thus, illusions and hallucinations of the senses, obsessions of all kinds, impulses to homicide, suicide, and theft, and systematised delusion, chiefly of an ambitious or mystico-religious (ecstatic) character, are met with. But accompanying these symptoms there are generally present the characteristic phenomena of the affection upon which they repose, and which help to distinguish them from the real diseases which they simulate. The phenomena in question include instability of the emotions, such as laughing followed by weeping, erotic tendencies, disorders of motility and of sensation, lassitude (neurasthenia) both physical and mental, irregular and unaccountable conduct, or excessive unintelligible activity.

The true insanity of hysteria is of two kinds, viz. the

form which accompanies the fits, and the moral alienation which is often characteristic of the confirmed malady. The first form is a transient mania occurring during or immediately after the fits. It has been compared by Briquet to the delirium manifested by a person emerging from chloroform narcosis. The patients experience illusions and hallucinations; they talk volubly and excitedly of events recently passed through; they are emphatic, alarmed, insistent, and sometimes struggle violently. If the hysteria is caused by a fright or shock, the incidents of that situation are gone over in the dreamy unreal way characteristic of delirium. In other cases the symptoms resemble more those of acute confusional insanity; and hallucinations of sight, not unlike those met with in acute alcoholism, are present. This hysterical mania has indeed many points of similarity with the toxic insanities, to which it is probably closely allied. It differs conspicuously from the post-epileptic insanity, which, as has been stated, is a furious mania, attended by violent action and by an angry, sombre mental state.

The second form of hysterical insanity is that met with in the confirmed subject of the neurosis, and is characterised by great moral perversion. The patients are untruthful and unreliable, preferring deception of all kinds, without any apparent reasonable object, to open, straightforward conduct, and craving sympathy to such an extent that they not only imagine themselves the victims of the most diverse and serious diseases, but convince others of their sufferings. Not only so, but by some obscure power, of which we are entirely ignorant, they unconsciously simulate diseases, of the symptoms of which they themselves cannot possibly have any knowledge. All such patients are neurasthenic, mentally and physically; their general health is poor, and their sufferings, as a rule, very great. Others manifest perverted instincts of all kinds, and the most bizarre phobias, obsessions, and impulses. When we regard all such persons as neurasthenics and degenerates, afflicted in addition with hysteria, and when we recall the illimitable nervous instability of persons belonging to those three classes, and their capacity for abnormal conduct in every sphere of human activity, and when we further remember that

in the hysteric we perceive the embodiment of the quintessence of mental degeneracy, it becomes easy to sympathise with their sufferings, and to learn to be surprised at no manifestation of their malady.

Treatment.—The treatment of hysterical insanity is the treatment of hysteria. The patients must be placed away from the influence of their friends, and among strangers. They must be kept quiet, free from excitement, and firmly but kindly treated. Massage, and the Weir Mitchell treatment are, in suitable cases, of the greatest value, while in the more robust cases warm baths, with cold douching gently applied to the head and spine, are often useful. Valerian valerianate of zinc and various nerve tonics are of use in reducing the irritability of the nervous system. Marie and Voisin both recommend opium, but there is always a risk of establishing the habit. Finally, moral treatment, consisting in the establishment of regular habits of work and thought of a sedative and agreeable character, cannot be neglected with the younger patients.

III. *Chorea.*—Chorea is undoubtedly a metabolic neurosis; it is intimately allied with hysteria, with epilepsy, and with mental disease, these diseases occurring not only in the personal antecedents of the patients, but sometimes as complications of the attack; but its relation with rheumatism is too evident to be disputed by anybody. Even Gowers,[1] who is an opponent of the connection between the neuroses and the diatheses, states "The hypothesis which seems best to explain the fact of the pathology of chorea is the old theory that the common cause of the endocarditis and of the chorea is a blood state, allied to, but not identical with, that which causes acute rheumatism. The result of this endocarditis is the formation of minute emboli, which tend to plug the distant arterial branches in the brain and spinal cord, and which, if they are not the immediate cause of the nervous symptoms, at any rate complicate and aggravate them. But this question has not been finally settled." In any case chorea forms the best sample and most absolute proof of a neurosis depending entirely upon a blood condition of arthritic origin. On this

[1] Gowers, *Diseases of the Nervous System*, vol. ii. (1893), p. 617.

point Charcot[1] says: "In my opinion no form of chorea deserves to be called rheumatismal in the strict acceptation of the word. I do not believe that chorea can ever be considered as the equivalent in the nerve centres of rheumatic fever in the joints. Chorea and rheumatism exist frequently in the same individual and in the same family; but their frequent coincidence and alternation do not suffice to show that they are identical. Although the coincidence is more common in the case of chorea, it may be equally emphasised in every other neurosis almost without exception—in hysteria, epilepsy, paralysis agitans, Grave's disease, and the insanities."

Chorea exists in two forms—the chorea of Sydenham, an acute spasmodic affection chiefly met with in young subjects, and the chorea of Huntingdon, a chronic, hereditarily transmissible affection occurring chiefly in adults. Acute chorea is a motor disturbance characterised by exaggerated voluntary movement, and at the same time by numerous simultaneous involuntary and purposeless movements. Chorea may occur in pregnant women (chorea gravidarum), and in old persons (chorea senilis); but it is most commonly met with in the acute form as a disease of children and young adults. The affection commences usually with a slight motor disorder limited to certain movements, especially to such parts of the body as the arms, face, neck, or shoulders. The movements become clumsy and embarrassed, and involuntary twitchings make their appearance; and although there is no physical pain, there is considerable mental distress. Gradually the movements become more general, the muscles of the arms, legs, face, and trunk being, except during sleep, in almost constant motion. This condition lasts from six weeks to six months, and is generally recovered from.

The mental condition in acute chorea is markedly peculiar in about two-thirds of all cases. Before the appearance of the muscular symptoms the subjects are generally irritable, morose, and liable to outbursts of temper. Children especially are troublesome, obstinate, violent, and sulky by turns. This is often looked upon by their guardians as wilful naughtiness curable by punishment.

[1] Charcot, *Leçons de Mardi.*

When the chorea is fully established, a distinct insanity of the maniacal or confusional type often supervenes between the first and the fourth week of the malady. The patients are noisy, restless, getting out of their clothes, talking and behaving insanely. In more severe cases the symptoms resemble those of acute delirious mania, and the attack may end fatally. There is great excitement, rise in temperature, and mental confusion, ending in stupor or coma. Fortunately, however, only a few of the cases end in this way. In almost all cases of choreic mania there are hallucinations and illusions of the senses, especially of sight. This insanity in the great majority of cases is transient and lasts only a few hours or a few days.

In chronic chorea the mental affections are also chronic. Systematised delusion, with hallucinations and illusions, is common. The behaviour of the patients is often of an impulsive, offensive, and dangerous character. Mental weakness is usually present, which gradually leads up to complete dementia. This form of chorea is incurable.

Treatment.—Like the insanities of epilepsy and hysteria, the treatment of choreic insanity is that of chorea. The nervous system must be strengthened by rest, tonics, careful bathing with douching of the spine, and especially by the administration of the most nourishing food, administered in the most assimilable forms possible.

CHAPTER XVIII

INSANITY CAUSED BY BRAIN DISEASE; SENILE INSANITY; SECONDARY DEMENTIA

I. *Post-Apoplectic Insanity.*—This group includes all the forms of mental disorder that occur secondarily to gross lesions of the brain, chiefly atheromatous disease of the cerebral arteries, softenings, and tumours. An extensive atheromatous change in the blood-vessels of the brain is of itself not infrequently the cause of cerebral symptoms, due to malnutrition of the essential nerve elements. Most commonly, however, the mental affection depends directly upon the rupture of one of the branches of the middle cerebral artery within the Sylvian fissures or of the smaller branches of the same artery, which go directly to supply the chief basal ganglia, corpus striatum and optic thalamus. An equally common mode of origin is embolus, blocking up the lumen of the same artery or of one of its branches. Although the middle cerebral is the vessel most frequently affected, and the one disease of which produces the most marked mental symptoms, yet any of the cerebral vessels may be the seat of the lesion, which secondarily reacts upon the mental condition of the individual. When an artery like the middle cerebral or one of its branches becomes, either through rupture or through blocking of its lumen, incapable of performing its function of supplying nutrition to important cerebral areas, there ensues devitality of the nervous tissues, frequently followed by softening and chronic inflammation. It is these secondary changes—softening, and chronic inflammation—which give rise to and maintain the peculiar mental aberration known as post-apoplectiform insanity.

The previous state of the brain nutrition, the condition of the arteries themselves, abnormalities in circulation, and chronic heart disease, modify the resistance of the brain tissue, and render it more liable to manifestations of abnormal mental action. A condition of senility may closely resemble the mental symptoms of paralytic insanity, the reason being that in such cases the cerebral vessels are severally atheromatous, and the brain nutrition is consequently impaired.

Mental Symptoms.—The mental symptoms vary considerably in individual cases. There is always present a certain amount of dementia or mental enfeeblement, characterised or accompanied by puerility, intense emotionalism, with loss of memory, mental confusion, and loss of judging power. The amount of mental enfeeblement varies considerably. It will generally be observed that after a person well advanced in years has had an apoplectic seizure, there results a complete change in the mental disposition and in the attitude towards the surroundings. If the person has been formerly strong-willed, active, and masterful, he often becomes facile, over-good-natured, and docile. If, on the other hand, the ordinary mental disposition has been placid, the individual often becomes petulant, ill-tempered, and discontented. Most of the cases become unfit for their former avocation, and unable to take an active part in the business of life. Emotionalism is invariably present, either in a slight degree or very marked and constant. There is an undue disposition to weep for absurdly trifling causes. So marked is this disposition to weep that the observer can often, by changing the tone of his voice into a sympathetic or consoling strain, bring tears into the patients' eyes. Some of the cases exhibit an extreme mobility of emotion, and may be made to laugh or weep at will. In most of the older cases the mental enfeeblement is slowly progressive, but in the majority of the younger cases, and sometimes, exceptionally, in the older cases, the condition is not progressive, and may even to a certain extent be recovered from.

Apoplexy may be followed by any of the chief forms of insanity. Perhaps the most common form is mania. The character of the mania is greatly modified by the underlying

condition of dementia. We therefore find a noisy, incoherent excitement, accompanied by great motor restlessness, by illusions, especially of sight, and frequently by hallucinations. The patients are destructive, filthy in their habits, and always sleepless. Indeed, the symptoms seem to become accentuated during the night time, so that a mild excitement during the day is followed by violent maniacal exaltation, accompanied by loud noises and cries, during the night. The mania is usually intermittent, the attack lasting from two to three weeks, followed by a period of milder excitement without noise, which is never a true lucid interval. Melancholic depression may succeed the maniacal depression, forming a condition similar to *folie circulaire*.

More rarely melancholia is the form of insanity succeeding the brain lesions just described. The melancholia is usually very acute, accompanied by restlessness and incoherent talk. The actual amount of mental suffering is, on account of the prevailing mental weakness, nearly impossible to gauge.

Systematised delusional insanity, with visual and auditory hallucinations, may also result from these brain lesions. The delusions are irregular in their manifestation, and are usually of a depressed or persecutory form, and are quite distinguishable from progressive systematised insanity and from the systematised insanity of the degenerate.

Physical Symptoms.—The physical symptoms of post-apoplectic insanity vary according to the seat of the lesion. Paralysis, hemiplegia, paraplegia, and contractures of various kinds are met with. Speech defects are very common, being due either to the mental condition, to paralysis of the cranial nerves supplying the muscles of the face and tongue, or to aphasia, caused by implication of those parts of the cortex which are intimately associated with the faculty of speech. If the posterior part of the third left frontal convolution is implicated, there is more or less complete motor aphasia. If, on the other hand, the auditory word centre is affected, there is word deafness, with an incapacity to understand spoken language. Affections of the angular gyrus and neighbouring portions of the occipital lobe produce word blindness,

so that the patient is unable to read written language. Finally, motor and sensory aphasia may be variously combined.

The bodily nutrition is usually considerably lowered. Sleep is always disturbed, and most of the patients are worse at night. It is on account of this restlessness and noise during the night that it is found impossible in many cases to keep the patients in private houses. As a rule the appetite for food is greatly increased, and food is taken with avidity. This is partly due to the demand of the system for nutrition, partly to the dehumanised and dementalised condition of the patient, and partly to the almost general defect of the memory, which prevents them from remembering the intervals between meals. In the progressive cases physical deterioriation keeps pace with the progressive mental enfeeblement, until finally everything has to be done for the patients, who are often confined to bed, and who have to be tended like infants. Trophic changes are frequently met with in the form of bed sores, which with care are usually preventible, and which generally occur at the point of greatest pressure.

Prognosis.—Except in young cases, where the affection is due to some cause external to the brain, such as heart disease, the prognosis is generally unfavourable. The liability to recurring attacks of apoplexy is very great, as well as the tendency to inflammatory extension of existing softenings. After each apoplectic seizure the mental condition deteriorates appreciably.

Treatment.—Treatment must therefore be applied towards the alleviation of the symptoms. In order to restore the disordered cerebral circulation it is advisable, especially where there is enfeebled cardiac action, and where the heart disease does not contra-indicate its use, to administer digitalis. Very often the mental symptoms improve during the exhibition of the drug. When there is restlessness and noise at night, any of the ordinary hypnotics may be administered; but it is well to begin with gentler remedies, and it will sometimes be found in the milder cases that hot soup, hot milk, gruel, or toddy, given at bedtime, will produce the desired effect. In the

severer cases, where hypnotics are for any reason contra-indicated or ineffectual, and where there is excitement during the daytime, opium will be found invariably useful. It is best given in the form of the ordinary tincture, either in small doses two or three times daily, or in one larger dose at bedtime. The demand of the patient for food ought to be as generously responded to as possible, for the excitement diminishes with the judicious administration of small quantities of nourishment, frequently administered.

II. *Tumours and Syphilitic Brain Affections*—(*a*) *Tumours.*—Cerebral tumours do not necessarily produce insanity. Indeed it has been computed that insanity is not present in more than one half of the cases. In those cases in which mental disturbance appears, it is met with in all degrees varying from slight mental dulness up to complete dementia, and from moral perversion up to the gravest forms of maniacal excitement. Accompanying mental alienation are the ordinary physical symptoms of tumour, varying according to its site, size, and character, such as coma, paralysis of various muscles, cephalalgia of an intense kind, vomiting, ataxia, optic neuritis, and epileptiform convulsions. Other symptoms occur according as the tumour simply irritates the brain or causes inflammation and softening or compression, with destruction of the brain substance.

Insanity may manifest itself as a change of disposition with moral decadence, want of interest, apathy or childishness, with loss of memory, or by moral change with moroseness, irritability of temper, and impulsive violence. Acute insanity may also appear, either in the form of acute mania, with great emotional and ideational mobility, or as a hypochondriacal melancholia. Occasionally a systematised ambitious insanity is met with. But by far the most common mental condition occurring in connection with cerebral tumour is a progressive enfeeblement of the intelligence, unattended with any more harmful symptoms than mental deterioration which ends in complete dementia.

(*b*) *Syphilitic Insanity.*—Much has been written upon the symptoms of syphilitic insanity, but it may confidently be stated on the authority of almost all the chief European

authorities that there is no such form of insanity. Like every other powerful toxin, syphilis reduces the physical health, lowers the nervous tone, and conduces to the appearance of ordinary insanity in the predisposed. It is a powerful agent in the production of hereditary degeneration, and its influence in this respect, as well as in the causation of general paralysis, has already been fully alluded to in the preceding pages. We are now about to consider its action in causing insanity by the formation of neoplasms (gummata), and by inducing disease of the arteries of the brain. Syphilitic lesions of the brain and its appendages are extremely irregular in their form and number. Tumours of gummatous nature are met with in all situations: osseous tumours and thickenings of the cranial bones, meningites of all kinds, encephalites or inflammation of local parts of the brain. All these may occur singly or combined with arterial disease, softenings, or local or disseminated sclerosis. Their diagnosis depends upon the physical symptoms which they severally produce, upon the history of syphilitic infection, and upon their amenability to the ordinary anti-syphilitic remedies. There is, however, one peculiarity of the syphilitic cerebral infection which is highly characteristic, namely, its tendency to cause local isolated paralyses of groups of muscles, chiefly of those supplied by the cranial nerves. A very common example is ptosis of one eyelid, due to paralysis of the third nerve.

The insanity accompanying cerebral syphilitic neoplasms, or degenerations of the kind mentioned above, may be similar to that stated as occurring in ordinary tumour, but more often it is of the nature of a moral change, an alteration in disposition, and a tendency towards a modification of the social instincts of the individual.

When syphilis affects the basal arteries, causing endarteritis, or when it produces general arterial sclerosis of the cerebral vessels, every form of vascular lesion may occur, followed by motor defects, paralyses, and contractures. Following the vascular injury, there sets in mental weakness of every degree. The patients become facile and childish, or irritable and emotional. Memory, which is not at first particularly impaired, gradually fails through want of attention. The

physical functions are well performed, and the condition of the case may thus remain unchanged for years. In other cases the dementia is preceded by mental excitement, which either occurs immediately or at some interval after the apoplexy.

Treatment.—Treatment should always in syphilitic brain affections be vigorously directed towards the removal of the lesion by anti-syphilitic remedies. This treatment is often successful, but unfortunately it only seldom happens that the mental deterioration passes off at the same time. On the contrary, it tends to pursue its course towards dementia.

III. *Traumatic Insanity.*—Professor Krafft-Ebing divides the insanity which follows head injuries into three classes:—1. Those cases in which the insanity immediately follows the accident; 2. Those cases in which there is an intermediate prodromal stage of longer or shorter duration, characterised by changes in the disposition and character; 3. Cases in which the injury only creates a predisposition to mental aberration, the insanity occurring after an interval of months or years.

The existence of traumatic insanity has been doubted by many authorities on account of the generally long interval between the receipt of the injury and the appearance of mental symptoms; but the relationship between head injuries and nervous and mental symptoms is probably beyond any dispute. It may generally be conceded that in the absence of gross cerebral injury, such as bone depression or secondary inflammatory condition, post-traumatic mental symptoms only occur in subjects who are predisposed to the psychoses, either by heredity or by acquired degeneracy.

The cases which immediately succeed injuries to the head are in all respects similar to confusional insanity after operations or after fevers. There is generally a noisy incoherent delirium, accompanied by hallucinations of sight or of hearing, and fleeting unsystematised delusions. The physical symptoms present all the features of severe nervous shock. There is debility, pinching of the features, anxious expression, dryness of the mouth and tongue, a slow, soft and feeble pulse, shallow breathing, and marked gastro-

intestinal disorders. Other physical symptoms will of course depend upon the nature of the cerebral injury, and whether it involves any of the chief motor or sensory nerve centres. Other cases may exhibit acutely maniacal or acutely melancholic symptoms.

In those cases in which there is an intervening prodromal condition, with altered character and disposition, there is usually a more or less severe accidental implication of the cerebral cortex, either by depression of bone, or local hæmorrhage, or meningitic sub-inflammatory local lesions. Most of the cases during the prodromal stage are sullen, morose, suspicious, indifferent to their surroundings, or exhibit a disinclination to associate with other people, or to interest themselves in ordinary matters. At the end of the prodromal period there most usually occurs an attack of acute mania of a furious and impulsive kind. Dr. Skae of the Ayr Asylum has reported a case of a man who received a depressed fracture of the skull over the left eyelid. He was unconscious for four days after the injury, and within a fortnight exhibited a morbid change of disposition and habit, being irritable, unsocial, and suspicious. Finally he became impulsive and acutely maniacal. Two months after admission into the Asylum an operation was performed, by which the depressed portion of bone was removed. Following the operation gradual improvement in mind took place, and the man eventually recovered.

In the class of cases which for many years after injury exhibits no insanity, there is generally to be found in at least one half of the cases a profound mental change, with moral deterioration and impulsive tendencies. Such cases are either hereditarily degenerate, or as a result of the injury to the nervous system develop an acquired mental degeneracy. A large proportion of these cases take to alcohol as a habit, and when the mental symptoms appear they are invariably aggravated by the alcoholic stimulant. In this group there are usually motor symptoms, either speech affections, consisting in a hesitancy and difficulty in pronunciation, which may simulate general paralysis of the brain, or muscular paresis of epilepsy.

Prognosis.—The prognosis of traumatic insanity is usually very grave. In the primary forms, which succeed immediately to injury, recovery often does take place, but a considerable proportion of the cases become demented, or lapse into chronic forms of mania, melancholia, or develop secondary paranoia. In the second group there is always danger of secondary changes, such as exostosis of the cranial bones, chronic extensive meningitis, and secondary brain softenings caused by hæmorrhagic effusion, or as the result of a secondary meningitic inflammation. Tumours have also arisen from direct injury of the brain or its membrane. In the third group the mental degeneracy of the patient, whether hereditarily or accidentally acquired, cannot of course be medically removed. If paralytic symptoms are present, either in the form of disordered speech manifestations, hemiplegias, pareses of the muscles, or convulsions, the prognosis is still more grave. The insanity of this group of cases, if of an acute character, may not be persistent, although it may tend to recur periodically. If there are fixed delusions with hallucinations, the prognosis of the insanity is also unfavourable.

IV. *Insanity of Sunstroke.*—In his *Clinical Lectures on Mental Diseases* Clouston remarks:—"Few Britons become insane in hot climates in whom sunstroke is not assigned as the cause."

This form of insanity is very similar to that caused by traumatism. The action of the direct rays of the sun in producing the affection has been disputed by some authorities; but there seems little ground to doubt it. On the other hand, cases have been known to occur among the firemen and stokers of large steamers, and among people serving in large overheated kitchens. Consequently the causation has been divided into those cases produced by the direct heat of the sun (*coup de soleil*), and those caused indirectly by heat and other influences (*coup de chaleur*). As in traumatism, the mental symptoms are greatly aggravated by the use of alcohol. The cases may be divided into those which occur immediately after insolation, and those occurring a longer or shorter period—it may be months or years—afterwards. In the first class the prognosis is more favourable. In the second

it is very grave. As a rule the cases of the second class exhibit a progressive mental deterioration, terminating in dementia.

The pathogeny of the mental symptoms has recently been investigated bacteriologically, with results which have still to be confirmed, but which point out the fact that traumatism and sunstroke, by suddenly lowering the nervous system and thus arresting phagocytosis, permit of the rapid and extensive development of micro-organisms in the blood and tissues. Reference has already been made to Bouchard's experiments with dogs in this connection, and to the bacteriological examination of the blood in some of the acuter forms of confusional insanity. Future investigations may confirm the presumption that the two forms of insanity we have been discussing are closely related to infective puerperal insanity, acute delirious mania, and some forms of acute confusional insanity.

Senile Insanity

Senile insanity has been divided into three kinds:—1. Those cases in which there is no dementia; 2. Those in which there is dementia, accompanied by the psychoses; 3. Those in which there is organic brain disease, or apoplectic insanity, which has been already described.

In the first form, in which there is no marked dementia, there usually supervenes a more or less acute attack of mania or of melancholia. The mania is acute, the patients being restless and troublesome, sleepless, somewhat confused mentally, and destructive and faulty in their habits. The subjects of this insanity are generally hereditarily predisposed, or have suffered from mania at previous periods of their lives. The melancholic form is also acute. The patients are debilitated, very anxious-minded, suffer from delusions and ideas of persecution, and also from hallucinations of hearing. Melancholia in senile cases is not so favourable as mania, and either lasts a very long time, or becomes chronic.

In the second class, or those in which there is senile dementia, the condition is dependent on advancing age. The age at which senile dementia occurs varies with the mental

constitution of the individual. In some cases it occurs as early as fifty years, in others as late as ninety. It is largely dependent upon heredity, vascular changes in the brain, and previous life-history. Superadded to this dementia, there is either mania, melancholia, or a form of systematised delusion. The maniacal cases are, like cases of paralytic insanity, sleepless, noisy, and excited during the night. Their actions are puerile and foolish; and sometimes they have impulses of a homicidal, suicidal, or sexual character. The melancholic cases, on the other hand, are extremely restless and emotional, and many of them have ideas of persecution. The systematised delusions may take the form of persecution or of ambition. In the former class the patients are in constant dread of being robbed: this is the most common false idea. They consequently hide their things in out-of-the-way places, and as their memory, like all senile dements, is defective, they are afterwards unable to find them. Many of them who live alone barricade their houses and doors for fear of thieves and robbers. In the majority of the cases there are hallucinations of sight and of hearing, but like the delusions these are of a rudimentary type. The delusions of ambition in senile cases usually exist side by side with delusions of persecution, generally with hallucinations, both of a pleasant and of a disagreeable character. The prognosis of senile insanity, combined with dementia, whether simple or due to localised brain disease, is always unfavourable.

Secondary Dementia

A philosophical review of the nature of mental affections must inevitably result in the conclusion that they one and all depend upon a disturbance of the mechanism of the conscious mind. If we assume, as we must assume if we give the matter any consideration at all, that the grey matter of the cerebral cortex is the material substratum through which the unconscious translates itself into the conscious mind, we must there look for those organic changes which are associated with insanity, and so far any changes discovered have been found there and nowhere else. It is true that pronounced

mental disturbance may occur and pass away, leaving behind it no traces that present methods of research can appreciate. Metabolic processes of an abnormal kind may poison the cells and disturb their harmony; toxins of all kinds may act upon the cortex, and, perhaps owing to inherent dynamic effects of which we know nothing, the cortical cells may be periodically excited or depressed. Take the example of chloroform narcosis: the abolition is complete, but after a few hours the functions are practically restored, and it is highly improbable that any histological trace of the condition remains. So is it with the so-called idiopathic insanities and some of the insanities connected with the neuroses. The nutritive recuperative power of the cortical nervous structures is such that they may pass through crises of an apparently destructive character, and survive them. That this is frequently not the case depends, it is almost certain, not wholly upon the nature of the disease processes themselves, but also upon the inherent resisting power of the nerve elements. Thus some persons become demented after one attack of mania; others have attacks frequently during a long lifetime without much appreciable mental deterioration. Some people can drink alcohol to excess for long periods, and retain comparative mental equilibrium; some can live into advanced age with unimpaired mental faculties; some epileptics never become insane. On the other hand, the disease process may, from the first, as in general paralysis, involve cerebral destruction and consequent dementia.

Secondary dementia, then, is a permanent mental deterioration depending upon destruction of cortical nerve elements, the result of previous disease action. It varies greatly according to the nature of the preceding malady, the hereditary power of resistance of the individual, and the character and extent of the nerve lesion. It may manifest itself as a mere change in disposition or as the most complete ineptitude for the simplest human requirements, with abolition of the faculty of attention, loss of memory, and absence of ordinary instincts. To attempt a division of this condition founded upon a clinical or pathological basis is manifestly impossible; but a rough classification of the forms depending upon the degree of nervous dissolution in order to present

the varieties of the affection is permissible. With this object I submit three degrees of dementia, which are not, strictly speaking, scientific divisions, but merely convenient for methods of description.

First Degree.—The first degree is that form of mental change which may succeed such affections as fever, delirium, an attack of acute insanity, a grave moral shock, a head injury, or an attack of alcoholism. The patient presents after recovery no external sign of mental weakness apparent to strangers, no loss of memory, no incapacity for affairs, and perhaps no marked moral deterioration. But those who know him well, and who have known him prior to the illness, perceive a change. They say, "he is not the man he was." His manner, his conduct, his disposition, his mode of reacting to circumstances, are different. The most subtle and analytical description of this condition with which I am acquainted is to be found, not in a medical book, but in a work of fiction, *The Master of Ballantrae,* by R. L. Stevenson. The consummate and, I presume, intuitive knowledge of abnormal human nature displayed by this writer may be illustrated by the following quotation from a book which, from first to last, is a great psychological study. After a duel with his brother, who was believed to be killed in the encounter, the subject of the quotation has a serious illness, perhaps a "brain fever," and his friend, who is seriously concerned by certain marked changes in his character after convalescence, expresses himself as follows:—"But to me the change appeared not natural, and viewing it along with all the rest, I began to wonder, with many head shakings, whether his reason were perfectly erect. As this doubt stretched over many years, endured indeed until my master's death, and clouded all our subsequent relations, I may well consider of it more at large. When he was able to resume some charge of his affairs, I had many opportunities to try him with precision. There was no lack of understanding nor yet of authority; but the old continuous interest had quite departed, he grew readily fatigued, and fell to yawning, and he carried into money relations, where it is certainly out of place, a facility that bordered upon slackness. True, there was nothing excessive in these relaxations, or I would have been no

party to them. But the whole thing marked a change, very slight, yet very perceptible, and though no man could say my master had at all gone out of his mind, no man could deny that he had drifted from his character. It was the same to the end with his manner and appearance. Some of the heat of the fever lingered in his veins, his movements a little hurried, his speech notably more voluble, yet neither truly amiss. His whole mind stood open to happy impressions, welcoming these and making much of them; but the smallest suggestion of trouble or sorrow he received with visible impatience, and dismissed again with immediate relief. It was to this temper that he owed the felicity of his later days, and yet here it was, if anywhere, that you could call the man insane."[1]

The truth of the above description will appeal powerfully to those who have observed similar changes of character following upon severe illnesses, whether mental or physical. Most people are conversant with the mental characteristics of certain confirmed invalids, their self-indulgent habits, their irritability of temper, their self-engrossment, and their occasional suavity of manner, which is an appeal for the sympathy of strangers. Unfortunately also the altered character of the recovered lunatic, of the man who has injured his brain with alcohol, of the man whose life has been embittered by some social calamity or physical injury, is only too well known to need description. In all these conditions the symptoms of mental deterioration vary according to the cause, according to the constitution of the individual, but more especially according to the extent to which the cortical nerve elements are permanently crippled. Such cases, it is almost unnecessary to add, are not insane in the general sense of the term. They live free lives, often self-supporting, though in a precarious way, and although they may be socially shunned and distrusted to a certain extent by men of the world, they are regarded as social units and entirely accountable for their actions.

Second Degree.—In dementia of the second degree the case is different; the subjects are regarded as irresponsible,

[1] R. L. Stevenson, *The Master of Ballantrae.*

and pass their lives under the supervision of others. They generally pass from the acute phase of the malady into the chronic one without freedom from restraint, and if, as most frequently happens, they have been treated in an asylum for the primary malady, they remain there to swell up the ranks of the chronic insane, of which they form the larger proportion. The typical forms of this affection constitute a very uninteresting group of the insane, but one which it is nevertheless very important to understand thoroughly. There is perhaps no distinct type of such cases, but the majority of them present certain well-marked, common features of mental aberration. Chief among these is the general weakening of the faculty of attention, which extends not merely to the failure to observe accurately and to interest themselves in the phenomena of their surroundings, but includes also a blunting of the appreciation of the finer personal and bodily sensations. It is not so much that their memory is at fault, as that impressions upon the senses are faintly recorded and registered by the cortical sensorium. These facts are illustrated particularly by the indifference which the patients manifest to extraordinary events, of which they may happen to be the witnesses. The death of a fellow-patient under the most tragic circumstances, the visit of a relative, a complete change in their habits of life, or a sudden bereavement, are events which take place without leaving the faintest apparent impression. They eat their food ravenously when it is presented to them, and yet it does not seem to occur to them to satisfy spontaneously their hunger, which must exist as a latent instinctive sensation. They do not appear to be conscious of untidiness or slovenliness in their personal appearance or apparel; yet when these things are pointed out to them they readily rectify the defects. They may read a book or a newspaper, and though the most exciting details may catch their eye, they fail to appreciate them, or at any rate they make no after-reference which would lead one to suppose that they appreciated anything they had read. Yet the same persons may play a game at draughts or chess or cards with ability far above the average; they may enjoy a comic opera to the full; and they are capable of performing work, such as clerk-

ing, figuring, gardening, or joiner work with care and discretion. They are more or less dead attentively to present impressions, yet the more organised, formerly acquired habits or movements have resisted dissolution so far as to permit of their mechanical performance. It is, however, far from correct to regard such persons as mere automata. They consciously regulate their movements; they are able to concentrate attention upon certain mental or physical employments or recreations, in which they happen to be interested; and within narrow limits they are able to converse rationally. It is, as has been already stated, a breakdown in the process of attention, the highest faculty of the human mind, from which they suffer. It is this want of attention that explains their weak will-power, their defective memory, and the inconsequent, relaxed, indifferent character of their conduct. Physically such patients present nothing abnormal beyond a certain amount of nervous and muscular weakness, and a lowered resistance of the tissues, which renders them liable to succumb to various constitutional diseases, of which phthisis is the most common.

Although the foregoing is the type of secondary dementia met with in large asylums for the insane, yet the dementia is liable to considerable variation, depending upon the nature of the acute form of mental affection to which it is consecutive. It often happens that where the primary malady has been of the nature of a recurrent mania, the patients continue to suffer from periodic attacks of acute mania during their subsequent life. If the dementia follows a chronic delusional mania, the delusions may continue in a modified form, and if the patient has suffered from a systematised insanity, the delusions persist in a modified and weakened form along with the dementia. The same, but in a less pronounced degree, is the case in melancholic dementia.

Third Degree.—Dementia of the third degree involves a much more serious dissolution of the cortical elements. The patients, while presenting all the typical features already described, are in addition irresponsive, do not converse at all, or do so irrationally and incoherently. They are unable to do any work, or that only of the simplest and most mechanical

kind, such as wheeling a barrow or polishing a floor. They have no interests, no will-power, no memory for events, and appear in all respects to live a more or less exclusively vegetal existence. Most of them, unless actively watched, are faulty in their habits and deficient in all the ordinary human instincts. The physical functions may be well performed, and the organic health may be unimpaired; but the movements are slow and purposeless, the face defective in expression, for, there being no emotions, there can be no external manifestation of active cerebral life. Such patients do nothing for themselves; they have no felt wants, no desires, no aspirations, no appreciation of their surroundings, and therefore no initiative. As in dementia of the second degree, there are varieties of this form, depending upon the nature of the process which has led up to this extreme condition of mindlessness. Some of the cases chatter continuously night and day, and are occasionally impulsive in their actions; others are stuporose, and sit passive and inert without being capable of any reaction whatever; while others are subject to recurrent attacks of mania or stupor. In those cases in which there is extending cortical softening from any cause, there is usually restlessness, sleeplessness, and incoherent emotionalism.

Pathology of Secondary Dementia.—We have to take into account two sets of changes: (*a*) The primary lesions causing the dementia, and (*b*) the secondary changes chiefly due to deterioration of nervous tissue, the result of atrophy from abolished function. The first of these changes it is unnecessary to discuss here, as they include chromatolysis and fibre destruction in the cortex, caused by the various acute forms of mental diseases already referred to. It is the progressive character of the second class of changes that renders dementia such a hopeless and incurable malady, and that give the typical *post-mortem* appearances to the brains of the subjects.

There is almost always some atrophy of the convolutions, especially of those of the convexity of the frontal lobes. This atrophy, which may be general over the anterior convolutions of that lobe or limited to one or two convolutions may be

extreme, and is then attended by serosity of the pia arachnoid. The effusion of serous fluid is often so extensive that the brain is said to be "waterlogged." The lateral ventricles are also distended with fluid, and the whole cerebral substance is soft and pulpy, and when laid on a table appears to collapse as the water runs out and the convolutions fall apart. Usually, however, the serosity is less extensive, and limited to the membranes over the atrophied convolutions.

Every form of membrane affection,—thickening, degeneration, and pacchymeningitis,—is met with. Focal softenings of a superficial nature are very common. The seat of these softenings is said by Bevan Lewis[1] to be most frequent in the following order: on the temporo-sphenoidal; occipital and cuneate; ascending frontal; postero-parietal; centrum ovale; annectant gyri; angular gyri; orbital; fusiform and uncinate; and the gyrus fornicatus.

Various secondary changes in the nutrition of the skull cap, such as general thickening, local deposits of bony accretion, general thinning of the bony tissue, and local atrophy, occur.

The histological appearances are, however, the most constant, and consist of alterations in the nerve elements in the neuroglia and in the capillary blood-vessels.

The nerve cells, especially those occupying the seat of convolutional atrophy, which in secondary dementia is usually present in the more anterior parts of the cerebrum, present extensive and well-marked signs of chromatolysis. Every stage of the process, from the "ghost cell" to the debris mass of the completely degenerated cell, is met with. Very few of the cell elements are perfectly normal; but perhaps the most marked appearance is the paucity of the finer, secondary cellular processes. The main primary processes of the cells seem to persist, but the finer, secondary non-medullated fibres are extensively degenerated. When the microscopic field is carefully examined, it is found that neuroglia cells abound in abnormal profusion in the grey cortex. Masses of these cells have themselves undergone atrophy, and lost their characteristic appearance; but their fibres exist in profusion to the detriment

[1] Bevan Lewis, *loc. cit.* p. 452.

and destruction of the intercellular nerve fibres. Underneath the pia and in the external cortical layer neuroglia cells, with their usual thick felting of fibres, replace almost entirely the true nervous structures.

The blood-vessels of the cortex in secondary dementia are often tortuous; their walls are thickened; and effusions of blood are frequent; but one of the most common appearances is the deposit of hæmatoidin crystals in the neighbourhood of the vessels. Such vascular changes indicate more directly the storms through which the cortex has previously passed rather than tissue degradation from disuse. The latter processes are more truly represented by the growth of the neuroglia elements, the progressive degeneration of the nerve elements, and the consequent atrophy of the cortex.

CHAPTER XIX

MEDICO-LEGAL CONSIDERATIONS

The great misfortune of insanity as compared with other diseases is that it incapacitates the individual legally and socially. Consequently, not only may the person of the patient be placed under forcible surveillance, but his civil rights may pass into abeyance; his financial and domestic affairs may require the supervision of others; and his actions, if criminal, demand special legal inquiry and special forms of legal censure. It will at once be evident from a consideration of the variety of abnormal mental manifestations, the complexity of modern society, and the intimate relationships of each individual to society and to the State, how complicated and extensive are the medico-legal aspects of insanity. It is not my intention in a work of this kind to traverse this immense field of legal medicine; but I shall endeavour to present briefly a few of its more common and important aspects.

Seclusion of the Insane.—First of all I desire to call attention to the question of the enforced restraint of the insane, which is resorted to for the care, treatment, and safety of the patient, and for the good of society. An insane person is not recognised as a free agent; his opinions and desires in the matter of his freedom or restraint are not generally taken into account; such matters are decided for him by other people—generally by his nearest of kin. But in civilised communities, where the liberty of the subject is jealously guarded, it is beyond the power of any one to incarcerate his insane relation without a medical opinion and a

medical certificate, which is countersigned by a magistrate. This certification of the insane is among the most serious and important duties of the medical profession, and its perfunctory or careless performance by a member of the profession is a sign of the grossest immorality and want of appreciation of civil responsibility.

The insane might be divided into (1) those whom it is unnecessary to certify with a view to isolation; (2) those whom it is difficult or impossible to certify; and (3) those whom it is easy and expedient to certify. The removal of the insane from their homes to institutions or to the care of strangers is rendered unnecessary by the character of the symptoms they display, and by the amount of care and supervision which their relatives are able to afford. The two circumstances are relatively interdependent. Thus, when the mental affection is mild and chronic, as in imbecility of a slight degree, secondary dementia of the minor form, or post-hemiplegic dementia, and when there is an absence of positive mental symptoms of a dangerous or obnoxious character, the patient is not interfered with as a rule, provided the home surroundings are not inimical to the patient's welfare and comfort. In isolated forms of acute mental aberration, such as the delirium of fever, the various forms of confusional insanity of a transitory nature which follow surgical operations, fevers, or pneumonia, hysterical delirium, the result of shock or fright, mild puerperal manias, and a host of other similar conditions, the patients are not certified or removed, unless the surroundings of the case make it imperative to do so in the interests of common humanity. Finally, when expense is no object, and the patient or his friends can afford medical attendance, good and sufficient nursing, and plenty spare accommodation of a suitable kind, there is no advantage in having the patient certified and removed to an establishment for the insane, whatever the nature of the malady may be. Each case has to be judged in accordance with its own peculiar circumstances, and the above remarks have therefore only a general bearing.

One cannot spend many years among the insane, as the present writer has done, without meeting with some cases in

asylums who, though insane, should not have been certified and isolated; but such cases are few. On the other hand, many cases are met with outside asylums who, though undoubtedly insane and manifestly unfit to be at large, succeed, either through the indifference of others or owing to the indefinite nature of their symptoms, in eluding certification. So long as these persons do not violate the peace of society, or transgress the ordinary laws of conduct demanded by the State, they may do very much as they please, to their own detriment and to the disturbance of the peace of mind of their relations. I refer more especially to the moral insanity of the degenerate, and the moral perversions that follow acquired degeneracy as a result of alcoholism, traumatism, sunstroke, syphilis, or severe illnesses, such as fevers, hysteria, and other affections. It is unnecessary to go over the field of degeneracy again. It is sufficient to acknowledge freely that its most pronounced symptom is a lowering of the moral sense, for which the subject is as irresponsible as he would be for colour-blindness or intellectual imbecility. Such cases do not present any of those positive mental symptoms, such as delusions, or hallucinations, which facilitate certification; they are neither irrational nor incoherent in conversation; they show neither mental enfeeblement, nor undue excitement, nor depression of spirits—yet they are not as other people in their conduct, in their views of life, or in their attitude to their environment. We may be convinced of their insanity, but without a disregard of truth we cannot write such a description of their insanity as would convince others of our opinion, were the facts to be submitted to impartial judges. Many of these people indulge in alcohol and other narcotics to excess; but intemperance is not of itself a sufficient ground for certification; and we must remember that with them it is almost always a symptom, not a cause, as so many people who ought to know better are too willing to believe. The fact seems to be that we have not yet reached that stage of civilisation where reckless immorality and persistent irregularity of conduct and temper are recognised as abnormal. Society is ready enough to condemn, but not to pity, and medical psychology has not advanced except sporadically to the recognition of the

less apparent forms of mental aberration. It is misfortune enough that nothing can be done by our profession to ameliorate the lot of the young degenerate who is not technically insane; but it is much worse that we often can do nothing to shield him from the too undiscriminating arms of blind justice, when by chance he is immolated for crimes which are more the outcome of a vicious organisation than of wilful wickedness.

Besides the foregoing group, we are not infrequently consulted regarding patients who are evidently the subjects of delusions of suspicion and persecution, but who are careful not to commit themselves to any expression verbally or in writing which might compromise them. Their conduct may be apparently influenced to a profound degree by their morbid suspicions, and may cause grave concern and anxiety to those with whom they pass their lives; and yet it may be of such a nature as to stop short of the limits of technical lunacy. In the same category are the host of suspicious, credulous, combative, litigious, weak-minded degenerates, who render their own lives and those of others unbearable, but who, notwithstanding, manage to steer warily clear of certification and asylums. It is true that sooner or later most of these cases exceed bounds, and place themselves within the compromising limits of justifiable certification; but it is none the less a fact that the difficulty of certifying them on ordinary occasions is often insurmountable, and that it is better left unperformed. The same advice must be given in regard to the occurrence of many cases of obsessions and impulses, even when they are of a highly dangerous nature. It is our duty to warn the relatives, and to advise the patient to place himself under restraint, and to take what other precautions circumstances and common sense dictate, but we cannot certify as insane a man of lucid mind because he may at some future time commit suicide or homicide or theft. When along with impulse there exists a definite mental aberration or a neurosis like epilepsy, the case is different; but even in epilepsy we must ascertain from personal knowledge of the patient that the disease is accompanied by some form of mental disturbance which constitutes at least temporary insanity. The same holds true of other neuroses,

such as alcoholism, hysteria, and chorea. Mental or physical weakness, whether congenital or acquired as the result of brain disease, or due to senile changes in the brain, does not in itself (unless it extends to dementia) constitute insanity, and cannot therefore form the basis of certification. It is true that this rule is frequently disregarded, and that many people who are a burden on society or on their relatives are conveniently stowed away in asylums, where perhaps they are better tended than outside; yet the result does not exonerate the certifying physician.

Certification.—The number of the insane who may conscientiously be certified is unfortunately sufficiently great to justify us in passing to their consideration without dwelling longer upon the small minority whose certification is attended with such difficulties as have been briefly alluded to. When called upon to examine and certify a case by a legally responsible person, such as a near relative, or in the case of a pauper by the representative of the parochial authorities, we should satisfy ourselves on three essential matters, namely, the patient's identity, his mental unsoundness, and his fitness for institution treatment. The first of these points is purely legal, but its importance is so self-evident that it need not be insisted upon. It would be an unfortunate and awkward thing if after we had certified John Smith, junior, John Smith, senior, were to be led off to the asylum; or if Mrs. John Smith, residing at No. 7, having been certified, two trained nurses should go to the house of Mrs. John Smith, No. 17, who happened to be lying ill in bed, proceed to dress her, and forcibly attempt to remove her from her house.[1] Therefore, having established the patient's identity, be careful to designate him correctly in the statutory form always used. It may here be stated once for all that the form should be carefully filled up, and the marginal directions most literally complied with. The question of fitness or unfitness for certification has already been discussed, and there remains the most important point of all—the mental unsoundness of the patient. Is the person insane? If you have any serious doubt on that question, refuse to certify. There is no compulsion imposed on any

[1] An analogous incident occurred in the writer's experience.

medical man to perform this serious, disagreeable, and important duty. If you have no doubt, proceed to certify, but conviction is not sufficient. Valid reasons for the opinion must be given. These reasons should express literally the mental process by which the physician arrived at his conclusion, otherwise the certificate is morally false. If it is wrong to hang a man and try him afterwards, it is equally wrong to pronounce him insane and give irrelevant reasons for so doing. The excuse that it is not always easy to give adequate expression to our beliefs does not extend to medical certificates of insanity. In forming an opinion on the mental unsoundness of an individual it is necessary to observe accurately the *tout ensemble* of the person under examination, his appearance, his manner, his attitude, his actions, his behaviour, his clothing, and his speech. His positive and his negative actions and reactions must also be taken into account. As a rule the more pronounced and typical mental disturbances, such as mental excitement, mental depression, or mental confusion, present no difficulty in diagnosis; and the accompanying multitude of personal disorders and mental and physical symptoms which characterise these affections present a richness of detail for descriptive purposes which it is usually more difficult to curtail than to extend. For the mere diagnosis of the malady is not sufficient; the physician must convey in plain language suitably adapted to the lay mind the character of the symptoms which the patient manifests.

When we have to deal with systematised delusion and the more occult disorders of mind, which, while they leave the intellect, so far as concerns general subjects and external appearance, comparatively intact, yet profoundly influence the sphere of general disposition and the innate attitude towards surroundings, the case is entirely different. The patient is usually reticent and on his guard. We require, therefore, to approach him with caution, with common sense, and with as much knowledge of the world and of affairs as nature has gifted us with. Deception and a false representation of our mission can do no good, but may end in the failure of our object. The chief and most effective method is to gain the confidence of the patient, which when once attained almost

always ensures success. Having fully elicited the delusions or hallucinations, we should if possible recount them succinctly in the patient's words thus:—"He says," or "he believes," etc. etc., and if the statements are not manifestly improbable, we should, having satisfied ourselves of their groundless nature, add "which are delusions" or "hallucinations," as the case may be. We should also if possible observe the patient's manner of reaction under the influence of the delusions and hallucinations, and if that is not possible, we may describe it on the authority of another person; but it is necessary to give the name and designation of our informant. In all medical certificates of insanity it is advisable to add supplementary information given by other people corroborative of our own opinions; and the names and designations of our informants should always be appended.

The practical, clerical, and legal details connected with the filling in of the forms of medical certificates are now demonstrated in every medical school in the country, and their description here would be a mere waste of time. The essential quality of discriminating between mental soundness and unsoundness, between fitness and unfitness for certification, and of selecting from much irrelevant matter the most veracious and at the same time the most accurate and convincing evidences of insanity, cannot be imparted either orally or in books. The surest method of attaining this hitherto very rare accomplishment is through a conscientious clinical study of mental affections.

Certification of incapacity for management of business or property.—Certificates of incapacity for managing property or business have no necessary bearing upon the freedom of the individual certified, but they have the effect of suspending his civil functions. As a rule it is only in cases of mental aberration specially requiring such a course that petitions are presented having for their object the removal of the patient's power to control his estate. Many of the cases have already been certified as insane, others are actually under restraint, and in the great majority of the remaining cases it is usually found that complete unanimity prevails among the most interested parties concerned as to the advisability of the

proposed action at law. It is only occasionally and at rare intervals that the proposed step is opposed, either by the person himself or by some of his relatives. Except in the latter case the responsibility of granting such certificates is not so onerous, and never so serious or important a duty as the granting of a certificate of insanity for curtailing the liberty of a patient. At the same time, it is not by any means suggested that the duty is a trivial one, or one to be lightly undertaken or carelessly performed. On the contrary, it demands the same care, the same amount of examination, and the same sense of responsibility in its performance as the certificate of insanity. The English law requires a detailed statement of the patient's mental symptoms in so far as these bear upon the question of the mental incapacity of the individual for the management of his affairs; the Scottish law is satisfied with a definite statement of opinion to the effect that the subject of the certificate is insane and thereby incapacitated from managing his affairs or of giving proper directions for their management. If of our simplest actions it is true that we can never foresee their ultimate consequences, it is abundantly manifest that in the granting of such important documents as lunacy certificates the risk of unforeseen consequences is enormously increased. We should, therefore, for our own comfort and safety, guard our position, not only by a most thorough and exhaustive examination of the patient, but also record for future reference a series of notes taken on the spot setting forth the bases of our opinion. These notes should cover ground more extensive than the requirements of the certificate, and should be of such a nature as amply to justify our conclusions. A certain degree of insanity *per se* is not a sufficient ground for certifying a person as being unfit to manage or direct the management of his affairs. For instance, mental weakness, immoral conduct, eccentricity, depression of spirits, or mental excitement, are all of them, unless extreme, not inconsistent with such capacity. Again, a person may be the subject of delusions, or of hallucinations, or of both, but so long as these do not bear directly upon his business affairs, or profoundly disturb his private life so that business is neglected, and unscrupulous people thereby acquire undue influence to the

detriment of the patient's interests, we are not justified in interfering. But with rare exceptions insanity is the one and only basis of certification in this connection. There are therefore two questions to be decided by the examining physician. (*a*) Is the patient insane? (*b*) Does his insanity clearly and indubitably interfere with his business capabilities? If on both questions an affirmative opinion is arrived at, it is well, as has already been suggested, to place the main facts, under each head, on record for future reference.

Testamentary Capacity of the Insane.—Testamentary capacity is one of the most vexed questions in the domain of legal medicine, and one in which the medical profession has often been particularly unhappy in its appearance in the law courts. This is the more regrettable because legal authorities are on this question more in harmony with one another, the decisions are more coherent and developmental, and the liberalism accorded to medical views is more pronounced than in almost any other department of jurisprudence. It is not always possible to avoid being implicated in controversial legal disputes upon will-making or will-breaking; but where it is possible to stand aside it is bad policy to rush in. There is almost always bad feeling on both sides, a strong desire to win, and a tendency displayed to purchase evidence, especially expert evidence.

The medical man is, however, often indirectly dragged into these litigations. A patient may die whose will is afterwards disputed, or he may be called upon in the exercise of his profession to sign a will as medical witness, or to grant a certificate of testamentary capacity prior to the signing of a will. It is only necessary here to state the precautions which ought to be taken before granting a certificate of testamentary capacity or before signing a will (for the signature of the doctor as witness is a tacit acknowledgment that he believes his patient to be testamentarily sound), and coincidentally the legal positions which must be borne in mind in the performance of this duty; for if these are properly understood it enables us to master the whole question of medico-legal testamentary capacity.

As in the immediately previous question of capacity for

the transaction of business, it is necessary to consider whether or not the testator is insane, and if insane, whether the insanity is of such a nature as to debar him from properly disposing of his estate. Insanity in itself does not invalidate the terms of a will; but whenever called upon to witness as to the mental state of a testator, we should first carefully note the character of any mental symptoms that may be present, and then proceed to determine their relation to the question of the testament. Upon a consideration of these two points depends our decision for or against testamentary capacity. If there is no insanity and no mental obfuscation, whether due to drugs or to physical disease, we must pronounce for validity. If there is insanity or mental confusion, we have to determine whether or not it is sufficient to invalidate the will. The medical man must satisfy himself thoroughly of the following points:—

(1) That the memory of the testator is sufficiently strong at the time the will is being made to enable him to recall the main purposes of his disposition when asked to repeat them. He need not be expected to know the exact amount of his property: but he should have approximate general ideas of its nature and extent. He should be able to name his principal legatees, and should have clear ideas as to their claims upon his bounty and of their relative positions in the will. Even if the testator is undoubtedly insane, still if he can show a disposing memory, a sufficiently clear judgment, and an unbiassed will, his testament will be held valid at law.

(2) An insane testator, who would be otherwise incapacitated, can make a valid will during a lucid interval, even though there is no complete restoration to sanity during the interval, provided it can be established that he is temporarily in possession of a disposing memory, judgment, and will.

(3) Moral insanity, so long as it does not disturb the intelligence or is not accompanied by abnormal suspicion, hate, or morbid personal bias against a legitimate heir, or so long as it does not affect the disposing mind, is not held to invalidate.

(4) Delusions do not affect validity, provided they are

foreign to the subject-matter of the will. It is, however, an extremely delicate and difficult matter to determine the exact limit of the influence of any delusion. Delusions of persecution having reference to a person outside the scope of the will may disturb the testator's judgment regarding the claims of his various legatees; and similarly with delusions of ambition. Except very rarely, we are not called upon to consider this secondary influence of delusion.

(5) Neither subsequent suicide nor subsequently occurring insanity, even should the testator have been previously peculiar, eccentric, or somewhat weak-minded, affects validity.

(6) We must be satisfied that the patient was not intoxicated or under the influence of drugs at the time the will was drawn up or signed.

(7) It is very important, though not always easy, to discover whether he is being unduly influenced, coerced, or deceived in the matter of the disposal of his property.

Criminal Responsibility of the Insane.—The question of criminal responsibility in mental disease is one upon which the last word has not by any means been said in this country. It has to be admitted that on the whole the law as it presently exists in Great Britain is lamentably behind our civilisation, and inferior to similar legislation in France, Germany, and some of the American States, in regard to the punishment of the insane criminal. It is true that here and there a judge, and now and again a jury, rises superior to the time-honoured usage, and takes the broader humanitarian view of a special case; but the legal test of responsibility is hard, fast, and inelastic. The answers of the judges to the questions put by the House of Lords in 1848, which pronouncements still form the standard of legal opinion in this country in regard to the criminal responsibility of the insane, may be briefly summarised as follows:—

(1) The fact of the presence of an insane delusion does not exculpate an individual, otherwise sane, if he knew at the time of committing the crime that he was acting contrary to the law of the land.

(2) If under the influence of his delusion he supposes another man to be in the act of attempting to take his life,

and he kills that man, as he supposes in self-defence, he would be exempt from punishment.

But if his delusion was that the deceased had inflicted a serious injury upon his character and fortune, and he killed him in revenge for such supposed injury, he would be liable to punishment.

(3) It must be clearly established, in the event of the defence setting up a plea of irresponsibility on the ground of insanity, that at the time of committing the act the accused party was labouring under such a defect of reason from disease of the mind as not to know the nature and quality of the act he was doing; or that he did not know he was doing what was wrong.

We see from the above opinion that the prevailing legal test of criminal responsibility is the knowledge of right and wrong, and that no cognisance whatever is taken of the power of personal restraint or inhibition; obsession or impulse is not even considered; and the weakened will-power, the result of defective inheritance or disease, or of the long-continued irritation caused by inveterate delusions or hallucinations, is wholly disregarded in favour of the abstract test of the intellectual knowledge of right and wrong. This pronouncement implies that a knowledge of right and wrong involves at the same time the power to do right and to avoid wrong—an assumption which is very far from the truth when applied to the sane, to say nothing of the insane. "If most persons could *do* right in the measure that they *know* it—if the knowledge of right lay in the afferent nerves, the pedagogue could soon perfect the world."[1]

The cases of insane criminals in whom there is no knowledge of right and wrong, or who do not know the "nature and quality" of the act they commit, are very few indeed, so few that for practical purposes the opinion of the judges is either valueless or pernicious, according as we choose to regard it, or according to its application in special cases.

If, then, the "right and wrong" test must be repudiated, what remains? A test founded upon the degree of moral responsibility of the individual has found supporters, and a

[1] W. F. Becker, *Alienist & Neurologist*, vol. xix. p. 577.

school of medical opportunists, headed by Legrand du Saulle, have advocated the infliction of punishments graduated according to the amount of moral inhibition present. The "right and wrong" test of the lawyers has at least this to be said in its favour, that it is intelligible and of comparatively easy application; but the moral responsibility test has nothing to recommend it. We cannot by any known means gauge a man's power of inhibition, and even if that were possible at the time of examination, it would be impossible to refer back to his state in this respect at the time when he committed the crime. The only true conclusion, in my opinion, is that there is only one test—the presence or absence of insanity; it is a simple test and as easy of application to the criminal as to any other social unit. If the prisoner is insane, it is our duty to urge the fact strenuously against all attempts to discredit our testimony and to hold us up to ridicule. The existence of insanity, if proven, rightly exempts from punishment, but it has always been the endeavour of the legal mind, supported by a considerable section of public opinion, to make light of medical evidence in all but the most obvious cases of insanity, for fear of encouraging the too frequent pretext of irresponsibility on this account, and thus endangering the security of society. This erroneous idea is born of the old belief that morality and social order are entirely matters of police arrangement. Hitherto at any rate the law has certainly erred on the side of severity, and has hanged ninety-nine irresponsible persons for one responsible person who has escaped on the plea of insanity. Although insanity exempts from punishment, society demands in its own interests the seclusion of the insane criminal, which seclusion is in itself of the nature of a very irksome kind of punishment, so that there is no question of the setting loose of the dangerous lunatic upon harmless society. The talk of the defeat sustained by justice in some cases is only a defeat of the old retaliative idea of punishment, which has had a fairly long reign over the insane in the past, and can now afford to relax its grim hold.

Just as there are people whom we cannot conscientiously certify as insane, though convinced of their insanity, so there are criminals of whose irresponsibility we may be certain,

though we are unable to urge our opinions, backed by those details which are necessary for the purpose of establishing irresponsibility in a court of law. Of such are the host of borderland cases—degenerates with defective inhibition, obsessed cases, cases with impulses of various kinds, such as to homicide, theft, drunkenness, etc., sexual inverts, and sexual perverts. In most of these cases there is a perfectly lucid mind, with a keen recognition of their position and a strong desire to escape punishment. What ought our position to be towards this great group of neuropathic borderland cases? All artificial tests fall away in presence of their rather subtle and obscure mental symptoms. If technical insanity cannot be established, we must plead in face of an angry justice and an unbelieving public their total irresponsibility, for a limited irresponsibility is both impracticable and impossible. They are not criminals, but degenerates really insane, whom it is the clear duty of a civilised State to isolate from society and place under medical treatment, but neither to punish retaliatively by committing them to jails, nor confound with the insane by placing them in lunatic asylums.

The first important step in this direction was begun by our legislature this year when it put into effect the provisions of an Act for the treatment in separate homes of certain classes of inebriates.

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THE END

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